



United States  
Department of  
Agriculture

Soil  
Conservation  
Service

In cooperation with  
United States Department  
of the Interior,  
Bureau of Land Management,  
and University of Nevada,  
Agricultural Experiment  
Station

# Soil Survey of Storey County Area, Nevada





# How To Use This Soil Survey

## General Soil Map

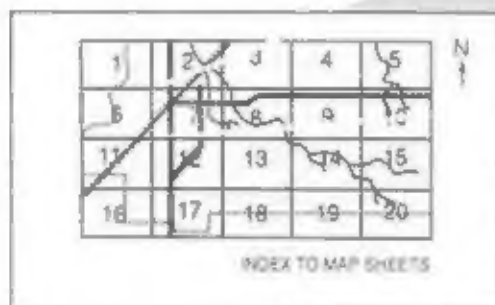
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

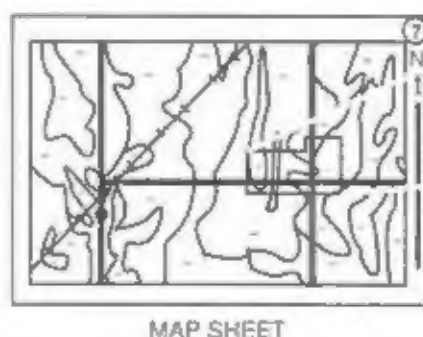
## Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

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This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This survey was made cooperatively by the Soil Conservation Service, the Bureau of Land Management, and the University of Nevada, Agricultural Experiment Station. It is part of the technical assistance furnished to the Washoe-Storey Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: The Truckee River is in right foreground. Field on flood plain adjacent to the river is Sagoupe sandy loam, 0 to 2 percent slopes, rarely flooded. Higher lying field on fan toe slopes is Perazzo very gravelly sandy loam, 2 to 4 percent slopes. Large fan is mainly Cleaver soils. On low hills is Theon-Old Camp association and on higher hills is Old Camp-Hefed-Rock outcrop association.



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# Foreword

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This soil survey contains information that can be used in land-planning programs in Storey County Area, Nevada. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the suitability of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Charles R. Adams  
State Conservationist  
Soil Conservation Service



Location of Storey County Area in Nevada.

# Soil Survey of Storey County Area, Nevada

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By Warren M. Archer, Soil Conservation Service

Fieldwork by Warren M. Archer and David M. Candland,  
Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service  
In cooperation with  
United States Department of the Interior, Bureau of Land Management, and  
University of Nevada, Agricultural Experiment Station

STOREY COUNTY AREA is in the west-central part of Nevada. It includes all of Storey County except the extreme eastern part. The survey area has a total area of about 162 180 acres, or 254 square miles.

Virginia City is the county seat of Storey County. The population of Storey County was about 1,750 in 1983.

Important physiographic units in the area are the Flowery and Virginia Ranges. There are no major valleys within the area. The highest point in the area, 7,864 feet above sea level, is atop Mount Davidson, and the lowest point, about 4,160 feet, is on the Truckee River, at the eastern end of Truckee Canyon.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps of adjacent areas. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, or the extent of soils within the survey.

## General Nature of the Survey Area

This section briefly discusses the industries and transportation, water supply, drainage, geology, and climate of the survey area.

### Industries and Transportation

Mining and its supporting industries have been the only significant industries in the survey area. Tourism,

recreation, ranching, and mining provide the economic base for the area. Irrigated farmland is of small extent in the area.

State Highway 341, a paved all-weather road, connects Virginia City with Reno via U.S. Highway 395, and it connects Virginia City and Gold Hill with Carson City via U.S. Highway 50. A county road connects Virginia City with U.S. Highway 50 at a point about 6 miles east of Dayton. It is a graded and drained road that traverses Six Mile Canyon. U.S. Interstate Highway 80 provides access to the north side of Storey County at Lockwood, Clark Station, and Painted Rock. The only other public road is a county road that follows Long Canyon from Virginia City to Lockwood. It is not maintained regularly. Two private roads belonging to the Eagle Picher and Gooseberry Mines connect Clark Station with their respective mining properties. All other roads in the survey area are not maintained, and in many places four-wheel-drive vehicles are required to negotiate them.

The Southern Pacific Railroad has a siding at Clark Station, which serves the Eagle Picher Mine.

There are no airports in the survey area. Air transportation is available at Reno and Carson City.

### Water Supply

Irrigation water for the limited irrigated cropland in the survey area is diverted from the Truckee River. Water for

mining operations and domestic use originally was provided in 1873 by a system of reservoirs, flumes, and an inverted siphon having a length of 38,300 feet and a hydraulic head of 1,720 feet. The source of the water was the Sierra Nevada 20 miles to the west. With some modification, the system is still in use today.

## Drainage

Drainage within the survey area is limited to various streams that flow intermittently in spring. The source of water is runoff from snowmelt and spring rains. Long Valley and Lousetown Creeks and the streams in Sox Mesa and Gold Canyons often flow until midsummer because they are fed by springs in addition to runoff.

## Geology

The geologic evidence available from the rocks exposed at the surface in the survey area shows that there have been two main deformational episodes in the area—one of late Mesozoic age and the other of late Tertiary and Quaternary age.

The period of deformation that began in the middle to late Tertiary and has continued to the present has shaped the existing topographic features in the area. Structural features associated with this deformation include normal faulting and associated tilting, warping, wrench faulting, and folding associated with wrench faulting.

The rocks from which the soils in the area have developed are primarily andesite, basalt, rhyolite, and rhyodacite with some intercalated sedimentary lenses of diatomite, shale, sandstone, conglomerate, and waterlaid tuff. Some very small intrusions of plutonic rock, mainly granite and quartz monzonite, are present in the southeastern part of the area. Alluvial deposits in the survey area are derived mainly from the rocks within the area. Material along the flood plain and terraces of the Truckee River has been transported from the Sierra Nevada.

Soils that formed in residuum and material derived from andesitic rock are characterized by the Olac, Old Camp, and Burnborough soils. Soils that formed in material derived from basalt where on a stable surface have developed very clayey subhorizons. Manogue and Riley soils are examples. Chalco and Haar soils formed in material derived from the intercalated sedimentary rock. The plutonic granitic rock that has weathered in place provided the parent material for the Chill soils. Ackley soils formed in alluvium derived from this rock.

The older alluvium that has remained stable from the late Pliocene has produced the Fulstone, Reno, and Cleaver soils, while the recent alluvium has produced the more youthful Veta, Hunewill, and Perazzo series.

Soils that formed in sandy alluvium on the Truckee River flood plain are in the Sagouspe series. Saralega soils formed in loamy alluvium on the high terraces.

Eolian sand deposited on the high terraces has produced the Patna and Isoide soils.

## Climate

*Prepared by the National Climatic Center, Asheville, North Carolina*

In this survey area, summers are hot, especially at lower elevations, and winters are cold. Precipitation usually is light at the lower elevations during all months of the year, therefore, the area is used mainly as rangeland. At higher elevations, precipitation is much greater and snow accumulates to a considerable depth. Much of the snowmelt is used to irrigate crops in nearby valleys.

Table 65 gives data on temperature and precipitation for the survey area, as recorded at Virginia City, Nevada for the period 1951-80. Table 66 shows probable dates of the first freeze in fall and the last freeze in spring. Table 67 provides data on length of the growing season.

In winter, the average temperature is 34 degrees F and the average daily minimum temperature is 25 degrees. The lowest temperature on record, which occurred at Virginia City on December 9, 1972, is -11 degrees. In summer, the average temperature is 67 degrees and the average daily maximum temperature is 79 degrees. The highest recorded temperature, which occurred on August 8, 1970, is 100 degrees.

Growing degree days, shown in table 65, are equivalent to heat units. During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 3 inches, or 25 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 2 inches. The heaviest 1-day rainfall during the period of record was 2.18 inches at Virginia City on January 20, 1969. Thunderstorms occur on about 13 days each year, and most occur in summer.

Average seasonal snowfall is 50 inches. The greatest snow depth at any one time during the period of record was 49 inches. On the average, 30 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 30 percent. Humidity is higher at night, and the average at dawn is about 70 percent. The percentage of possible sunshine is 90 percent in summer and 70 percent in winter. The prevailing wind is from the west. Average windspeed is highest, 8 miles per hour, in spring.

Every few years a blizzard accompanied by high winds and drifting snow strikes the survey area. Even at lower

elevations, snow remains on the ground for many weeks and livestock suffer.

## How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unmodified parent material in which the soil formed. The unmodified material is devoid of roots and most other living organisms and has not been changed by other biologic activity.

The soils and miscellaneous areas in the survey area are in orderly patterns that are related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil or miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge gradually into one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes. Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

Some interpretations were modified to fit local conditions, and some new interpretations were developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.





# General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The soils or miscellaneous areas making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils or miscellaneous areas can be identified on the map. Likewise, areas that are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general map units in this survey represent general kinds of landscape for broad interpretive purposes. The map units are described in the following pages.

## Map Unit Descriptions

### 1. Typic Durargids-Lithic Haplargids

*Gently sloping to very steep, shallow, well drained soils, on piedmont slopes and foothills*

This map unit is in areas south and east of Clark. The vegetation is mainly shadscale, desert needlegrass, Indian ricegrass, and Bailey greasewood.

This unit makes up about 5 percent of the survey area.

The Typic Durargids are shallow, gently sloping to strongly sloping soils on piedmont slopes. These soils have a gravelly or cobbly, medium textured or moderately coarse textured upper layer and a moderately fine textured lower layer over an indurated hardpan.

The Lithic Haplargids are shallow, moderately steep to very steep soils on foothills. These soils have a gravelly or stony, medium textured or moderately coarse textured upper layer and a moderately fine textured lower layer over bedrock.

Of minor extent in this unit are Lithic Tororthents, Typic Torripsamments, Typic Haplargids, Lithic Xerollic Haplargids, and Xerollic Camborthids. The Lithic

Tororthents are on steep, south-facing hill sides, they support shadscale, Bailey greasewood, and Indian ricegrass. The Typic Torripsamments are on dissected lake plain remnants, they support Indian ricegrass, winterfat, and fourwing saltbush. The Typic Haplargids are on alluvial fans, they support shadscale, Bailey greasewood, and Indian ricegrass. The Lithic Xerollic Haplargids are on back slopes of hills, they support big sagebrush and green ephedra. The Xerollic Camborthids are in drainageways, they support big sagebrush and spiny hopsage.

This unit is used for livestock grazing and rangeland wildlife habitat. The main limitations are the very low average annual precipitation and the low available water capacity. This unit is not suited to range and seeding.

### 2. Abruptic Xerollic Durargids-Xerollic Haplargids

*Gently sloping to moderately steep, shallow, moderately deep, and very deep, well drained soils, on piedmont slopes*

This map unit is along the southeastern boundary of the survey area, adjacent to the Carson Plains, and in the north-central part.

This unit makes up about 4 percent of the survey area.

The Abruptic Xerollic Durargids are shallow and moderately deep, gently sloping to moderately steep soils on old alluvial fan remnants. These soils have a cobbly or stony, moderately coarse textured upper layer and a fine textured lower layer over an indurated hardpan. The soils support low sagebrush, Thurber needlegrass, and bottlebrush squirreltail.

The Xerollic Haplargids are very deep, gently sloping soils on insel fans and fan skirts. These soils have a moderately coarse textured upper layer, a medium textured middle layer, and a moderately coarse textured and coarse textured, gravelly lower layer. The soils support Wyoming big sagebrush, Anderson peachbrush, and Thurber needlegrass.

Of minor extent in this unit are Xerollic Durargids and Xerollic Camborthids. The Xerollic Durargids are on low hills, they support low sagebrush and bluegrass. The Xerollic Camborthids are in drainageways, they support big sagebrush and spiny hopsage.

This unit is used for livestock grazing and rangeland wildlife habitat. Some areas have been subdivided and are used as homesites. The main limitation for the

production of range and plants is the low average annual precipitation. This unit is not suited to range and seeding. The main limitations of this unit for homesite development are high shrink-swell potential and the hardpan in the Abruptic Xerollic Durargids.

### 3. Lithic Xerollic Haplargids-Xerollic Haplargids-Entic Chromoxererts

*Moderately sloping to very steep, shallow to deep, well drained soils, on mountains, foothills, and mountain-valley fans and in intermontane basins*

This map unit covers most of the northern half of the survey area.

This unit makes up about 65 percent of the survey area.

The Lithic Xerollic Haplargids are shallow soils on back slopes of hills and mountains. These soils have a gravelly to extremely stony medium textured upper layer and a moderately fine textured gravelly or cobbly lower layer over hard bedrock. The soils support big sagebrush, low sagebrush, and Thurber needlegrass.

The Xerollic Haplargids are shallow to deep soils on back slopes of mountains and hills, on mountain-valley fans, and on coluvial slopes. The shallow soils are on convex slopes and ridges and are underlain by weathered bedrock. The moderately deep and deep soils are on concave back slopes, colluvial slopes, and mountain-valley fans. These soils have a moderately coarse textured to medium textured, gravelly to extremely stony upper layer and a medium textured to fine textured lower layer. Bedrock is at a depth of 20 inches or more. The soils support big sagebrush, low sagebrush, and Thurber needlegrass.

The Entic Chromoxererts are moderately deep to deep soils on basalt flow terraces and plateaus and in basins. These soils are fine textured throughout the profile and have a very stony to cobbly upper layer. The soils support little leaf horsebrush, shadscale, and rabbitbrush.

Of minor extent in this unit are Typic Haplargids, Aquic Xerofluvents, Lithic Xeric Tororthents, Aridic Argixerolls, and Aridic Durixerolls. The Typic Haplargids are on south-facing back slopes at the lower elevations; they support desert needlegrass, spiny hopsage, and shadscale. The Aquic Xerofluvents are adjacent to the Truckee River; they support basin wildrye, creeping wildrye, rushes, and sedges. The Lithic Xeric Tororthents are in eroded areas; they support sparse stands of pinyon and juniper trees with an understory of antelope bitterbrush and sagebrush. The Aridic Argixerolls are on north-facing back slopes and ridges; they support big sagebrush, low sagebrush, and antelope bitterbrush.

This unit is used for livestock grazing and rangeland wildlife habitat. The unit is poorly suited to rangeland

seeding mainly because of the low precipitation. Other limitations are slope, stoniness, and low available water capacity.

### 4. Aridic Argixerolls-Lithic Argixerolls-Lithic Xerollic Haplargids

*Moderately steep to very steep, shallow to deep, well drained soils, on high mountains*

This map unit is at the higher elevations around Virginia City and extends to the north and northeast along the Virginia and Flowery Ranges.

This unit makes up about 26 percent of the survey area.

The Aridic Argixerolls are moderately deep and deep soils in plane to concave areas on back slopes, colluvial slopes, and mountain-valley fans. These soils have a gravelly to extremely stony, medium textured and moderately coarse textured upper layer and a medium textured to moderately fine textured lower layer. Bedrock is at a depth of more than 20 inches. The soils support big sagebrush, bitterbrush, and Thurber needlegrass.

The Lithic Argixerolls are shallow soils in plane to convex areas on back slopes and ridges. These soils have a gravelly to very stony, medium textured and moderately coarse textured upper layer and a medium textured to fine textured lower layer over bedrock. The soils support mainly low sagebrush, bitterbrush, and Thurber needlegrass. Some areas support pinyon and juniper trees.

The Lithic Xerollic Haplargids are shallow soils on south- and west-facing back slopes and ridges at the lower elevations. These soils have a gravelly to extremely stony, medium textured to moderately coarse textured upper layer and a medium textured lower layer. Bedrock is at a depth of less than 20 inches. The soils support big sagebrush, low sagebrush, bitterbrush, and green ephedra.

Of minor extent in this unit are Lithic Xeric Tororthents, Xerollic Haplargids, and Pacific Argixerolls. The Lithic Xeric Tororthents are on eroded back slopes and ridges; they support Jeffrey pine and ponderosa pine. The Xerollic Haplargids are on concave back slopes and fans at the lower elevations; they support big sagebrush, green ephedra, and desert needlegrass. The Pacific Argixerolls are on mountain-valley fans and in drained basins; they support big sagebrush, antelope bitterbrush, and basin wildrye.

This unit is used for livestock grazing and range and wildlife habitat. A few areas have been subdivided and are used for homesite development. The unit is poorly suited to rangeland seeding because of the steepness of slope and the presence of rock fragments on the surface. It is severely limited for homesite development because of the depth to bedrock and slope.

# Detailed Soil Map Units

## Definition of map unit

The map units delineated on the detailed maps included with this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and limitations of a unit for specific uses. The soil properties and characteristics described can be used to plan the management needed for those uses or for other ones. More information is given under "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation to precisely define and locate the soils and miscellaneous areas is needed.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes facts about the unit and gives the principal hazards or limitations to be considered in planning for a few specific uses. Soil suitability ratings are given for selected uses.

Soils that have profiles that are almost alike make up a *soil series*. The soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of one series can differ in texture of

the upper layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. A few of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Manogue cobbly clay 2 to 8 percent slopes, is one of several phases in the Manogue series.

Most map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or associations.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Old Camp-Rubble land-Rock outcrop complex, 30 to 75 percent slopes, is an example.

An *association* is made up of two or three geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Old Camp-Rock outcrop association is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Table 68 gives the acreage and proportionate extent of each map unit. Other tables ("see Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

## Explanations of introductory phrases

In the map unit descriptions that follow, a semitabular format is used. In this format a boldface heading (for example, **Composition**) is used to identify the information grouped directly below it. Introducing each item of information under the heading is an italicized term or phrase (for example, *Position on landscape*) that identifies or describes the information. Many of the

headings and introductory terms or phrases are self-explanatory; however, some of them need further explanation. These explanations are provided in the following paragraphs, generally in the order in which they are used in the map unit descriptions. More information is given in the sections "Use and Management of the Soils" and "Soil Properties."

*Map unit setting* is given for the entire map unit. The setting includes the landscape positions, elevation, and climate. The landscape positions given under "Map Unit Setting" generally are broader than those given for each major component. The elevation and climatic data given under "Map Unit Setting" are those applicable for the entire unit and are not given for the individual components.

*Composition* is given for the components identified in the name of the map unit as well as for the contrasting inclusions.

*Inclusions* are areas of components (soils or miscellaneous areas) that differ from the components for which the unit is named. Inclusions can be either similar or contrasting. *Similar inclusions* are components that differ from the components for which the unit is named but that for purposes of use and management can be considered to be the same as the named components. Note that in the "Composition" paragraph a single percentage is provided for a named soil and the similar inclusions because their use and management are similar. *Contrasting inclusions* are components that differ sufficiently from the components for which the unit is named that they would have different use and management if they were extensive enough to be managed separately. For most uses, contrasting inclusions have limited effect on use and management. Inclusions generally are in small areas, and it is not practical to map them separately because of the scale used. Some small areas of strongly contrasting inclusions are identified by a special symbol on the detailed soil maps. A few inclusions may not have been observed and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the inclusions on the landscape.

*Position on landscape* refers to the dominant position or positions on which the component is located. In naming landscape positions, an effort has been made to give the specific position of the component rather than a general position that could encompass other components. In some instances, however, the component is distributed over a larger landscape to such a degree that it is more nearly accurate to name the larger landscape positions rather than the local ones.

*Dominant present vegetation* refers to the plants that were growing in noncultivated areas at the time this survey was made. The range condition can be judged by

comparing the dominant present vegetation with that in the potential plant community.

*Typical profile* is a vertical, two-dimensional section of the soil extending from the surface to a restrictive layer or to a depth of 60 inches or more.

*Permeability* is the quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil.

*Available water capacity* is the capacity of the soil to hold water available for use by most plants. It commonly is expressed as inches of water per inch of soil (see "Glossary").

*Water supplying capacity* is the total water available in the soil for plant growth in a normal year from the precipitation, runoff, and water available from a capillary fringe minus runoff.

*Hydrologic soil group* is used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms (see "Glossary").

*Erosion factors (upper layer)* refers to the susceptibility of the soil to erosion. *K value* indicates the susceptibility of a soil to sheet and rill erosion by water. *T value* indicates the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. *Wind erodibility groups* indicate the susceptibility of soil to wind erosion. They are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas (see "Glossary").

*Hazard of erosion* refers to the hazard if protective cover is removed. The hazard of erosion is constant and cannot be increased or reduced.

*Shrink-swell potential* refers to the property of the soil that causes it to shrink or swell upon wetting or drying.

*Corrosivity* refers to the potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. Corrosivity to uncoated steel is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract. Corrosivity to concrete is based on soil texture, acidity, and amount of sulfates in the saturation extract.

*Potential frost action* is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing.

*Major uses* can include *current uses* and *potential foreseeable uses*. Current uses are affected by factors such as changes in population patterns and economic considerations. Potential foreseeable uses are those to which the unit is suited or for which the unit could be used if some limitation or limitations were overcome.



*Potential native plant community* refers to the plant community that would exist if present environmental conditions were to continue without interference by man. Information on plant community is given in the tables. A scientific plant symbol and the common plant name are given (15).

Three remaining topics—elements of wildlife habitat, ratings for selected uses, and interpretive groups—are discussed in this section. Because discussion of these topics is detailed, they are described under separate headings in the following paragraphs. More information is given under "Use and Management of the Soils" and "Soil Properties."

### Elements of wildlife habitat

The soils in the survey area are rated according to their suitability for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife. In selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat, and in determining the intensity of management needed for each element of the habitat.

The elements of wildlife habitat are described in the following paragraphs.

*Grain and seed crops* are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

*Grasses and legumes* are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, orchardgrass, brome grass, clover, and alfalfa.

*Wild herbaceous plants* are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are needlegrass, balsamroot, globemallow, wheatgrass, and bluegrass.

*Coniferous plants* furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are singleleaf pinyon and juniper.

*Shrubs* are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountain mahogany, bitterbrush, snowberry, and big sagebrush.

*Wetland plants* are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, reed canarygrass, saltgrass, cordgrass, rushes, sedges, and reeds.

*Shallow water areas* have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

### Ratings for selected uses

In the detailed map units, the soils are rated for various uses and the most limiting features are identified. The ratings are based on observed performance of the soils and on the estimated data given in the map units and lab test data. In this section the ratings for each use and the limiting features are defined.

Soil interpretations are periodically updated as more is learned about a soil and its behavior under specific uses. New technology can change the relative suitability of a soil for various uses, however, the soil maps remain useful after the soil interpretations originally published with them have become outdated. For this reason, the criteria and guides that were used to make the interpretations presented in the detailed map units are provided in the Appendix. These criteria have been taken directly from the National Soils Handbook (16).

The limitations for shallow excavations and local roads and streets are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The

ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

*Local roads and streets* have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 5 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

*Rangeland seeding* ratings are intended to be a relative rating that suggests the number of successful seeding establishments that might be expected during a given period of years. In addition, the number of plant species adapted to the soil decreases with decreasing soil suitability.

This rating is not intended to be a measure of the total annual yield. Productivity is dependent upon the interaction of most of the soil properties and characteristics that are considered.

Successful seeding of depleted areas of rangeland in Nevada results in decreased runoff and, subsequently, decreased soil losses from erosion.

Soils that are best suited to seeding are those that are moderately deep or deeper, receive adequate moisture and can hold it, are resistant to sheet, rill, and wind erosion, are free of salts and alkali, and have a medium textured surface layer that is relatively free of rock fragments and is resistant to crusting.

The limiting features of the soils in this survey area and a brief definition of each follows.

*Cemented pan.* A cemented pan is too close to the surface for the specified use.

*Cutbanks cave.* The walls of excavations tend to cave in or slough.

*Depth to rock.* Bedrock is too near the surface for the specified use.

*Droughty.* The soil holds too little water for plants during dry periods.

*Erodes easily.* Water erodes the soil easily.

*Excess salt.* The soil has excess water-soluble salts that restrict the growth of most plants.

*Excess sodium.* The soil has excess exchangeable sodium that restricts the growth of plants.

*Flooding.* The soil is flooded by moving water from stream overflow, runoff, or high tides.

*Frost action.* The moisture in the soil freezes and thaws. Frost action can damage roads, buildings, and other structures.

*Large stones.* The soil has rock fragments that are 3 inches (7.5 centimeters) in diameter or more.

*Low strength.* The soil is not strong enough to support a load.

*Ponding.* Water stands on the soil in closed depressional areas. The water can be removed only by percolation or evapotranspiration.

*Rooting depth.* The soil is shallow to a layer that greatly restricts roots, shallow root zone.

*Shrink-swell.* The soil shrinks when dry and swells when wet.

*Slope.* The slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specified use.

*Small stones.* The soil has rock fragments that are less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

*Soil blowing.* The soil is easily moved by wind.

*Subsides.* The soil settles because of the content of organic matter or the presence of saturated mineral layers.

*Too acid.* The soil is dry most of the time, and vegetation is difficult to establish.

*Too clayey.* The soil is slippery and sticky when wet and is slow to dry.

*Too sandy.* The soil is soft and loose; it is droughty and low in fertility.

*Wetness.* The soil is wet during the period of use.

## Interpretive groups

*Land capability classification.*—This classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland or woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VI. The numerals indicate progressively greater limitations and

narrower choices for practical use. The classes are defined as follows.

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter—e, w, s, or c—to the class numeral, for example, IIe. The letter e shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows that the soil is limited mainly because it is shallow, droughty, or stony; and c, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by w, s, or c because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, range and, woodland, wildlife habitat, or recreation.

**Site symbols.**—The site symbols given in each map unit identify a distinctive kind of grazing land that produces a characteristic natural plant community that differs from natural plant communities on other sites in kind, amount, and proportion of forage plants. The relationship between soils and vegetation was established during this survey; thus, grazing sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of forage plants. Soil reaction, salt content, and a seasonal water table are also important.

For each detailed soil map unit in this survey, a table entitled "Range and plants and woodland understory" is presented at the back of this report. The range sites and woodland understory sites for which data are given in these tables are identified by "range site symbols" and "woodland site symbols," respectively. Additional

information on these symbols is available at the local office of the Soil Conservation Service.

**Woodland suitability group.**—Soils suitable for wood crops are placed in a woodland suitability group and assigned an ordination symbol. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the ordination symbol, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter x indicates stoniness or rockiness; w, excessive water in or on the soil; t, toxic substances in the soil; d, restricted root depth; c, clay in the upper part of the soil; s, sandy texture; l, high content of coarse fragments in the soil profile; and r, steep slopes. The letter o indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: r, x, w, t, d, c, s, and f.

## Map Unit Descriptions

### 021—Bombadil-Indiano association

#### Map Unit Setting

**Position on landscape:** Hills

**Elevation:** 5,600 to 6,300 feet

**Climatic data (average annual):**

Precipitation—about 11 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

#### Composition

**Bombadil stony loam, 30 to 50 percent slopes (Lithic Xerollic Haplargids - loamy, mixed, mesic)—65 percent**

**Indiano gravelly loam, 30 to 50 percent slopes (Andic Argixerolls - fine, loamy, mixed, mesic)—25 percent**

**Contrasting inclusions as follows—**

**Inclusion 1:** Olac very stony loam, 30 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—5 percent

**Inclusion 2:** Rock outcrop—3 percent

**Inclusion 3:** Xerollic Haplargids (Xerollic Haplargids - loamy-skeletal mixed, mesic)—2 percent

#### Bombadil Soil

**Position on landscape:** South- and west-facing back slopes of hills

**Parent material:** Kind—residuum; source—andesite

**Dominant present vegetation:** Wyoming big sagebrush, spiny hopsage, pine bluegrass

**Rock fragments on surface:** Kind—stones, gravel, cobbles; percentage of surface covered—60 to 80

**Typical profile:**

0 to 2 inches—stony loam; 10 to 20 percent cobbles and stones and 25 to 40 percent pebbles (by weight); platy structure; soft, very friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM, estimated AASHTO classification—A-4

2 to 10 inches—gravelly loam, loam; 0 to 10 percent cobbles and stones and 10 to 30 percent pebbles (by weight); weak fine subangular blocky structure; slightly hard, friable, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CL-ML, CL; estimated AASHTO classification—A-4, A-6

10 inches—unweathered bedrock

**Range in depth to bedrock:** 7 to 14 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 1.5 inches

**Water supplying capacity:** 6 inches

**Runoff:** Rapid

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.32; T value—1; wind erodibility group—6

**Hazard of erosion:** By water—severe; by wind—slight

**Shrink-swell potential:** Moderate

**Corrosivity:** To steel—moderate, to concrete—low

**Potential frost action:** Moderate

**Indiana Soil**

**Position on landscape:** North- and east-facing back slopes of hills

**Parent material:** Kind—residuum; source—andesite

**Dominant present vegetation:** Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

**Rock fragments on surface:** Kind—gravel; percentage of surface covered—30 to 50

**Typical profile:**

0 to 13 inches—gravelly loam; 0 to 5 percent cobbles and 25 to 40 percent pebbles (by weight); subangular blocky structure; slightly hard, very friable, neutral (pH 6.8), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM-GC, CL-ML, GM ML, estimated AASHTO classification—A-4

13 to 33 inches—clay loam, gravelly clay loam, sandy clay loam; 0 to 15 percent cobbles and 15 to 40 percent pebbles (by weight); subangular blocky structure; hard, firm, slightly acid (pH 6.2);

nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—CL, SC, GC; estimated AASHTO classification—A-2, A-6, A-7

33 inches—unweathered bedrock

**Range in depth to bedrock:** 20 to 40 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 5.2 inches

**Water supplying capacity:** 11 inches

**Runoff:** Rapid

**Hydrologic group:** C

**Erosion factors (upper layer):** K value—0.32; T value—2; wind erodibility group—6

**Hazard of erosion:** By water—severe; by wind—slight

**Shrink-swell potential:** Moderate

**Corrosivity:** To steel—moderate to concrete—low

**Potential frost action:** Moderate

**Contrasting Inclusions**

**Inclusion 1:** Position on landscape—ridges of hills, contrasting features—35 to 60 percent rock fragments between depths of 2 and 10 inches; lower water supplying capacity; distinctive present vegetation—low sagebrush

**Inclusion 2:** Position on landscape—escarpments and ridges of hills, contrasting feature—bedrock exposed at the soil surface; distinctive present vegetation—barren

**Inclusion 3:** Position on landscape—toe slopes and swales of hills, contrasting feature—more than 40 inches deep to bedrock; distinctive present vegetation—Wyoming big sagebrush, bottlebrush, squirreltail, green aphedra

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 1)**

**Elements of Wildlife Habitat**

**Suitability of Bombadil soil for named elements.**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Suitability of Indiana soil for named elements.**

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

**Ratings for Selected Uses**

**(Bombadil Soil)**

**Suitability and limitations for the following use—**

Rangeland seeding: Poor—too and depth to rock, erodes easily

**(Indiana Soil)**

*Suitability and limitation for the following use—*

Range and seeding: Poor—erodes easily

**Interpretive Groups***Capability classification:* Bombadi soil—VIIc,

nonirrigated Indiano soil—VIIc, nonirrigated

*Range site symbol:* Bombadi soil—027X008N; Indiano soil—026X010N**051—Old Camp-Hefed-Rock outcrop association****Map Unit Setting***Position on landscape:* Mountains*Elevation:* 4,500 to 5,700 feet*Climatic data (average annual)*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 100 days

**Composition***Old Camp very stony loam, 50 to 75 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—40 percent**Hefed very stony sandy loam, 50 to 75 percent slopes (Xerollic Haplargids - loamy-skeletal, mixed, mesic)—25 percent**Rock outcrop—20 percent**Contrasting inclusions as follows—**Inclusion 1:* Rubble land—10 percent*Inclusion 2:* Old very gravelly sandy loam, 15 to 30 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—3 percent*Inclusion 3:* Thin stony sandy loam, 15 to 50 percent slopes (Lithic Haplargids - loamy-skeletal, mixed, mesic)—2 percent**Old Camp Soil***Position on landscape:* Upper part of back slopes of mountains*Parent material:* Kind—residuum, source—andesite volcanic rock*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass*Rock fragments on surface:* Kind—stones, cobbles, gravel; percentage of surface covered—90*Typical profile:*

0 to 2 inches—very stony loam; 25 to 55 percent cobbles and stones and 35 to 45 percent pebbles (by weight); platy structure; slightly hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, SC, SM-SC, GM-GC; estimated AASHTO classification—A-2, A-4

2 to 14 inches—very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam; 35 to 50 percent cobbles and stones and 50 to 65 percent pebbles (by weight); subangular blocky structure; hard, firm; strongly alkaline (pH 8.5); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2, A-6

14 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches*Depth to seasonal high water table:* More than 60 inches*Hazard of flooding:* None*Permeability:* Moderately slow*Available water capacity:* 1.5 inches*Water supplying capacity:* 6 inches*Runoff:* Very rapid*Hydrologic group:* D*Erosion factors (upper layer):* K value—0.17, T value—1, wind erodibility group—8*Hazard of erosion:* By water—moderate; by wind—slight*Shrink-swell potential:* Low*Corrosivity:* To steel—high; to concrete—low*Potential frost action:* Moderate**Hefed Soil***Position on landscape:* Lower part of back slopes of mountains*Parent material:* Kind—colluvium, source—volcanic rock*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass*Rock fragments on surface:* Kind—stones, cobbles, gravel; percentage of surface covered—75*Typical profile:*

0 to 2 inches—very stony sandy loam; 30 to 45 percent cobbles and stones and 30 to 40 percent pebbles (by weight); platy structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM-SC; estimated AASHTO classification—A-2

2 to 14 inches—very gravelly sandy loam, very gravelly loam; 5 to 10 percent cobbles and stones and 45 to 65 percent pebbles (by weight); subangular blocky structure; hard, friable, mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2

14 to 60 inches or more—stratified very gravelly loamy sand to very cobbly sandy loam; 15 to 40 percent cobbles and stones and 25 to 50 percent pebbles (by weight); massive; slightly hard or hard, very friable or brittle; mildly alkaline (pH



7.6) nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SM; estimated AASHTO classification—A-1, A-2

*Depth to seasonal high water table* More than 60 inches

*Hazard of flooding* None

*Permeability* Moderately rapid

*Available water capacity* 3.5 inches

*Water supplying capacity* 8 inches

*Runoff* Very rapid

*Hydrologic group* B

*Erosion factors (upper layer)* K value—0.10; T value—5; wind erodibility group—6

*Hazard of erosion* By water—moderate, by wind—slight

*Shrink-swell potential* Moderate

*Corrosivity* To steel—high; to concrete—low

*Potential frost action* Low

#### *Rock Outcrop*

*Position on landscape* Ridges and back slopes of mountains

*Dominant present vegetation* Barren

#### *Contrasting Inclusions*

*Inclusion 1.* Position on landscape—below rock outcroppings and long narrow stringers on back slopes of mountains, contrasting feature—more than 90 percent stones on the surface, distinctive present vegetation—barren

*Inclusion 2.* Position on landscape—ridges, mountaintops, contrasting feature—very shallow; distinctive present vegetation—low sagebrush

*Inclusion 3.* Position on landscape—south- and west-facing back slopes of mountains, contrasting feature—thin light-colored upper layer, distinctive present vegetation—shadscale

#### **Major Uses**

Range and wildlife habitat

#### **Potential Native Plant Community (Table 2)**

#### **Elements of Wildlife Habitat**

*Suitability of Old Camp soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Hefed soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

*(Old Camp Soil)*

*Suitability and limitations for the following use—*

*Rangeland seeding:* Poor—droughty, large stones, erodes easily

*(Hefed Soil)*

*Suitability and limitation for the following use—*

*Rangeland seeding:* Poor—large stones

#### **Interpretive Groups**

*Capability classification:* Old Camp soil—V s, nonirrigated; Hefed soil—VI s, nonirrigated, Rock outcrop—VIIIs

*Range site symbol:* Old Camp soil—026X022N; Hefed soil—026X022N

#### **052—Old Camp-Rubble land-Rock outcrop complex, 30 to 75 percent slopes**

#### **Map Unit Setting**

*Position on landscape:* Mountains

*Elevation,* 4,200 to 6,000 feet

*Climatic data (average annual)*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 110 days

#### **Composition**

*Old Camp extremely stony loam, 30 to 75 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—40 percent*

*Rubble land—25 percent*

*Rock outcrop—20 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Hefed very stony sandy loam, 50 to 75 percent slopes (Xerollic Haplargids - loamy-skeletal, mixed, mesic)—10 percent

*Inclusion 2:* Olac very stony sandy loam 15 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—5 percent

#### *Old Camp Soil*

*Position on landscape:* Back slopes of mountains

*Parent material:* Kind—colluvium, source—andesite

*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—stones, gravel cobbles, percentage of surface covered—80

*Typical profile*

0 to 2 inches—extremely stony loam; 25 to 55 percent cobbles and stones and 35 to 45 percent pebbles (by weight); platy structure, slightly hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—GM, SM, SM-SC, GM-GC, estimated AASHTO classification—A-2, A-4

2 to 14 inches—very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam, 35 to 50 percent cobbles and stones and 50 to 65 percent pebbles (by weight); subangular blocky structure; hard, firm; strongly alkaline (pH 8.5), nonsaline (less than 2 mmhos/cm), nonsodic SAR of less than 3; estimated Unified classification—GC, estimated AASHTO classification—A-2, A-6

14 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 6 inches

*Runoff:* Very rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—severe, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Moderate

#### *Rubble Land*

*Position on landscape:* Back slopes of mountains

*Dominant present vegetation:* Barren

#### *Rock Outcrop*

*Position on landscape:* Ridges and back slopes of mountains

*Dominant present vegetation:* Barren

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—foot slopes and concave back slopes of mountains; contrasting feature—bedrock at a depth of more than 60 inches; distinctive present vegetation—Wyoming big sagebrush, Indian ricegrass

*Inclusion 2:* Position on landscape—shoulders and convex back slopes of mountains; contrasting features—very shallow, very low available water capacity; distinctive present vegetation—low sagebrush

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 3)**

#### **Elements of Wildlife Habitat**

*Suitability of Old Camp soil for named elements:*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

#### **Ratings for Selected Uses**

*(Old Camp Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, large stones, erodes easily

#### **Interpretive Groups**

*Capability classification:* Old Camp soil—VI's.

nonirrigated; Rubble land—VII's, Rock outcrop—VII's

*Range site symbol:* Old Camp soil—026X022N

#### **054—Old Camp-Olac-Indiana association**

#### **Map Unit Setting**

*Position on landscape:* Mountains

*Elevation:* 5,700 to 7,000 feet

*Climatic data (average annual):*

Precipitation—about 10 inches

Air temperature—about 50 degrees F

Frost-free season—about 100 days

#### **Composition**

*Old Camp very cobbly loam, 15 to 30 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed mesic)—45 percent*

*Olac extremely cobbly loam, 4 to 15 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed mesic)—25 percent*

*Indiana stony fine sandy loam, 15 to 50 percent slopes (Andic Argixerolls - fine-loamy, mixed mesic)—15 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Pachic Haploxerolls (Pachic Haploxerolls - loamy-skeletal mixed, mesic)—8 percent

*Inclusion 2:* Andic Haploxerolls (Andic Haploxerolls - loamy skeletal, mixed, mesic)—3 percent

*Inclusion 3:* Lithic Haplargids (Lithic Haplargids - clayey, montmorillonitic, mesic)—2 percent

*Inclusion 4:* Rock outcrop—2 percent

#### *Old Camp Soil*

*Position on landscape:* Plane to concave back slopes of mountains

*Parent material:* Kind—colluvium; source—andesite

*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—cobbles, gravel; percentage of surface covered—80

*Typical profile*

0 to 2 inches—very cobbly loam; 25 to 55 percent cobbles and 35 to 45 percent pebbles (by weight); granular structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, SM, SM-SC, GM-GC, estimated AASHTO classification—A-2, A-4

2 to 14 inches—very cobbly clay loam, extremely stony sandy clay loam; 35 to 50 percent cobbles and stones and 50 to 65 percent pebbles (by weight); subangular blocky structure; hard, firm; strongly alkaline (pH 8.5); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-2, A-6

14 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 6 inches

*Runoff:* Very rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

#### *Olac Soil*

*Position on landscape:* Upper side slopes of mountains

*Parent material:* Kind—residuum; source—andesite

*Dominant present vegetation:* Low sagebrush, Thurber needgrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, percentage of surface covered—90

*Typical profile:*

0 to 3 inches—extremely cobbly loam; 45 to 65 percent cobbles and 65 to 75 percent pebbles (by weight); granular structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM-GC, GM, estimated AASHTO classification—A-1, A-2

3 to 10 inches—extremely gravelly clay loam; 10 to 20 percent cobbles and 65 to 80 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GC, estimated AASHTO classification—A-2

10 inches—unweathered andesite

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 0.6 inch

*Water supplying capacity:* 6 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.05; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### *Indiana Soil*

*Position on landscape:* North- and east-facing back slopes of mountains

*Parent material:* Kind—colluvium, residuum; source—andesite

*Dominant present vegetation:* Wyoming big sagebrush, Thurber needgrass, antelope bitterbrush

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—80

*Typical profile:*

0 to 13 inches—stony fine sandy loam; 20 to 25 percent cobbles and stones and 20 to 35 percent pebbles (by weight); subangular blocky structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM, estimated AASHTO classification—A-2, A-4

13 to 33 inches—gravelly clay loam, sandy clay loam; 0 to 15 percent cobbles and stones and 15 to 40 percent pebbles (by weight); subangular blocky structure; hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, GC; estimated AASHTO classification—A-2, A-6, A-7

33 inches—unweathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 5 inches

*Water supplying capacity:* 11 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.32; T value—2; wind erodibility group—4

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

*Contrasting Inclusions*

- Inclusion 1:* Position on landscape—short, north-facing, concave back slopes of mountains, contrasting feature—receives additional moisture from runoff, distinctive present vegetation—mountain big sagebrush, antelope bitterbrush
- Inclusion 2:* Position on landscape—drainageways, contrasting feature—receives additional moisture from runoff, distinctive present vegetation—Wyoming big sagebrush
- Inclusion 3:* Position on landscape—shoulders of mountains, contrasting feature—very low water supplying capacity, distinctive present vegetation—shadscale, Indian ricegrass
- Inclusion 4:* Position on landscape—ridges, upper side slopes of hills, back slopes, contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 4)****Elements of Wildlife Habitat***Suitability of Old Camp soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Olac soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Indiano soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

**Ratings for Selected Uses***(Old Camp Soil)**Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, large stones

*(Olac Soil)**Suitability and limitations for the following use—*

Range and seeding: Poor—droughty, large stones, small stones

*(Indiano Soil)**Suitability and limitation for the following use—*

Rangeland seeding: Poor—erodes easily

**Interpretive Groups**

*Capability classification:* Old Camp soil—VIIIs, nonirrigated, Olac soil—VIIIs, nonirrigated, Indiano soil—VIIIs, nonirrigated

*Range site symbol:* Old Camp soil—026X022N, Olac soil—026X025N, Indiano soil—026X010N

**Map Unit Setting**

*Position on landscape:* Alluvial fans, rock pediments

*Elevation:* 4,400 to 4,800 feet

*Climatic data (average annual)*

Precipitation—about 6 inches

Air temperature—about 50 degrees F

Frost-free season—about 110 days

**Composition**

*Cleaver very gravelly sandy loam, 2 to 15 percent slopes (Typic Durargids - loamy, mixed, mesic, shallow)—50 percent*

*Stingdorn very cobbly loam, 4 to 15 percent slopes (Typic Durargids - loamy-skeletal, mixed, mesic, shallow)—35 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Veta very gravelly sandy loam, 2 to 4 percent slopes (Xerolic Camborthids - loamy-skeletal, mixed, mesic)—8 percent

*Inclusion 2:* Old Camp very cobbly loam, 8 to 30 percent slopes (Lithic Xerolic Haplargids - loamy-skeletal, mixed, mesic)—5 percent

*Inclusion 3:* Rock outcrop—2 percent

*Cleaver Soil*

*Position on landscape:* Remnants of alluvial fans

*Parent material:* Kind—alluvium; source—basalt, andesite

*Dominant present vegetation:* Shadscale, Bayley greasewood, Indian ricegrass

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—80

*Typical profile*

0 to 1 inch—very gravelly sandy loam, 0 to 10 percent cobbles and stones and 60 to 75 percent pebbles (by weight), massive, soft, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, estimated AASHTO classification—A-1

1 to 11 inches—gravelly loam, gravelly clay loam; 0 to 5 percent cobbles and stones and 25 to 50 percent pebbles (by weight); subangular blocky structure; hard, friable, mildly alkaline (pH 7.6), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, estimated AASHTO classification—A-6, A-7

11 to 20 inches—indurated hardpan

20 to 60 inches or more—extremely gravelly coarse sandy loam; 10 to 25 percent cobbles and stones and 75 to 90 percent pebbles (by weight); massive, slightly hard, very friable; strongly alkaline (pH 8.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3)

estimated Unified classification—GP, GP GM  
estimated AASHTO classification—A-1

*Range in depth to hardpan:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 1.3 inches

*Water supplying capacity:* .5 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—.0.10; T value—.1  
1 wind erodibility group—5

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Low

### *Stingdorn Soil*

*Position on landscape:* Rock pediment remnants

*Parent material:* Kind—alluvium, residuum, source—andesite

*Dominant present vegetation:* Shadscale, Bailey greasewood, Indian ricegrass

*Rock fragments on surface:* Kind—gravel, cobbles, percentage of surface covered—80

*Typical profile*

0 to 5 inches—very cobbly loam; 30 to 50 percent cobbles and 30 to 45 percent pebbles (by weight); granular structure; slightly hard, friable; moderately alkaline (pH 8.2), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SM-SC, estimated AASHTO classification—A-2, A-4

5 to 14 inches—very cobbly clay loam; 30 to 50 percent cobbles and 35 to 50 percent pebbles (by weight); subangular blocky structure; hard, firm; strongly alkaline (pH 8.5), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-6

14 to 15 inches—indurated hardpan

15 inches—unweathered bedrock

*Range in depth to hardpan:* 8 to 20 inches

*Range in depth to bedrock:* 8 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* .5 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—.0.10; T value—.1  
1 wind erodibility group—7

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Low

### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—channels, drainageways, contrasting features—very deep, receives additional moisture from runoff, distinctive present vegetation—Wyoming big sagebrush, rubber rabbitbrush, spiny hopsage

*Inclusion 2:* Position on landscape—escarpments of rock pediments, contrasting features—no hardpan, thick dark-colored upper layer, distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 3:* Position on landscape—escarpments and ridges of rock pediments, contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

### *Major Uses*

*Current uses:* Rangeland, wildlife habitat

*Potential foreseeable uses:* Public facilities, industrial park

### *Potential Native Plant Community (Table 5)*

#### *Elements of Wildlife Habitat*

*Suitability of Cleaver soil for named elements*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Stingdorn soil for named elements*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### *Ratings for Selected Uses*

*(Cleaver Soil)*

*Suitability and limitations for the following uses—*

Rangeland seeding: Poor—droughty, small stones too and

Shallow excavations: Severe—cemented pan, cutbanks cave

Local roads and streets: Severe—cemented pan

*(Stingdorn Soil)*

*Suitability and limitations for the following uses—*

Rangeland seeding: Poor—large stones, droughty too and

Shallow excavations: Severe—depth to rock

Local roads and streets: Severe—depth to rock

#### *Interpretive Groups*

*Capability classification:* Cleaver soil—VIs, nonirrigated, Stingdorn soil—VIs, nonirrigated

*Range site symbol:* Cleaver soil—027X018N, Stingdorn soil—027X018N



**062—Cleaver-Veta association****Map Unit Setting**

*Position on landscape.* Dissected alluvial fans

*Elevation:* 4,400 to 5,000 feet

*Climatic data (average annual)*

Precipitation—about 7 inches

Air temperature—about 50 degrees F

Frost-free season—about 110 days

**Composition**

*Cleaver very gravelly sandy loam, 4 to 15 percent slopes*  
(Typic Durargids - loamy, mixed, mesic, shallow)—65 percent

*Veta very gravelly sandy loam, 4 to 8 percent slopes*  
(Xerollic Camborthids - loamy-skeletal, mixed, mesic)—25 percent

*Contrasting inclusion as follows—*

*Inclusion 1:* Stingdom very cobbly loam (Typic Durargids - loamy-skeletal, mixed, mesic)—10 percent

**Cleaver Soil**

*Position on landscape:* Tops of dissected alluvial fans

*Parent material:* Kind—alluvium; source—various kinds of rock

*Dominant present vegetation:* Shadscale, Bailey greasewood, Indian ricegrass

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—80

*Typical profile.*

0 to 3 inches—very gravelly sandy loam; 0 to 10 percent cobbles and 60 to 75 percent pebbles (by weight), massive, soft, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GM, estimated AASHTO classification—A-1

3 to 11 inches—gravelly loam, gravelly clay loam; 0 to 5 percent cobbles and 25 to 50 percent pebbles (by weight); subangular blocky structure, hard, friable, mildly alkaline (pH 7.6), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—SC, CL, estimated AASHTO classification—A-6, A-7

11 to 46 inches—indurated hardpan

46 to 60 inches or more—extremely gravelly coarse sandy loam; 10 to 25 percent cobbles and stones and 75 to 90 percent pebbles (by weight); subangular blocky structure, hard, friable, strongly alkaline (pH 8.8), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—GP, GP-GM, estimated AASHTO classification—A-1

*Range in depth to hardpan:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 1.3 inches

*Water supplying capacity:* .5 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—5

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Low

**Veta Soil**

*Position on landscape:* Drainageways, inset fans, interfan-valley drainageways

*Parent material:* Kind—alluvium; source—various kinds of rock

*Dominant present vegetation:* Wyoming big sagebrush, spiny hopsage, Indian ricegrass

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—85

*Typical profile.*

0 to 6 inches—very gravelly sandy loam; 0 to 25 percent cobbles and 50 to 65 percent pebbles (by weight), platy structure, soft, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GM, estimated AASHTO classification—A-1

6 to 18 inches—extremely gravelly loam, very gravelly sandy loam, very gravelly loam; 10 to 30 percent cobbles and 50 to 70 percent pebbles (by weight), subangular blocky structure, slightly hard, very friable, neutral (pH 7.2), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—GM, estimated AASHTO classification—A-1, A-2

18 to 60 inches or more—stratified extremely gravelly loamy sand to very gravelly loam; 10 to 25 percent cobbles and 50 to 80 percent pebbles (by weight), massive, slightly hard, very friable, moderately alkaline (pH 8.2), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—GP-GM, GM, estimated AASHTO classification—A-1

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* Rare

*Permeability:* Moderately rapid

*Available water capacity:* 3.5 inches

*Water supplying capacity:* .7 inches

*Runoff:* Medium

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.10; T value—5; wind erodibility group—5

*Hazard of erosion:* By water—slight; by wind—slight  
*Shrink-swell potential:* Low  
*Corrosivity:* To steel—high; to concrete—low  
*Potential frost action:* Moderate

#### *Contrasting Inclusion*

*Inclusion 1:* Position on landscape—rock pediment remnants, contrasting feature—bedrock at a depth of 8 to 20 inches, distinctive present vegetation—shadscale

#### **Major Uses**

*Current uses:* Range and, wildlife habitat  
*Potential foreseeable uses:* Industrial park, public facilities

#### **Potential Native Plant Community (Table 6)**

##### **Elements of Wildlife Habitat**

*Suitability of Cleaver soil for named elements:*  
 Wild herbaceous plants (nonirrigated)—poor  
 Shrubs (nonirrigated)—poor  
*Suitability of Veta soil for named elements:*  
 Wild herbaceous plants (nonirrigated)—poor  
 Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

##### *(Cleaver Soil)*

*Suitability and limitations for the following uses—*  
*Range and seedling:* Poor—droughty, small stones, too acid  
*Shallow excavations:* Severe—cemented pan, cutbanks cave  
*Local roads and streets:* Severe—cemented pan

##### *(Veta Soil)*

*Suitability and limitations for the following uses—*  
*Range and seedling:* Poor—small stones  
*Shallow excavations:* Severe—cutbanks cave  
*Local roads and streets:* Moderate—flooding, frost action

#### **Interpretive Groups**

*Capability classification:* Cleaver soil—Vlts, nonirrigated, Veta soil—Vlls, nonirrigated  
*Range site symbol:* Cleaver soil—027X018N, Veta soil—026X024N

#### **080—Wedekind-Xman-Indiano association**

##### **Map Unit Setting**

*Position on landscape:* Mountains, hills  
*Elevation:* 5,500 to 6,000 feet  
*Climatic data (average annual)*  
*Precipitation:* about 10 inches  
*Air temperature:* about 48 degrees F

*Frost-free season:* about 100 days

#### **Composition**

*Wedekind gravelly loam, 30 to 50 percent slopes (Aridic Argixerolls - loamy, mixed, mesic, shallow)—40 percent*

*Xman very stony loam, 30 to 50 percent slopes (Xerollic Haplargids - clayey, montmorillonitic, mesic, shallow)—25 percent*

*Indiano stony sandy loam, 30 to 50 percent slopes (Aridic Argixerolls - fine-loamy, mixed, mesic)—20 percent*

##### *Contrasting inclusions as follows—*

*Inclusion 1:* Devada very cobbly loam (Lithic Xerollic Haplargids - clayey, montmorillonitic, mesic)—6 percent

*Inclusion 2:* Mizel very gravelly coarse sandy loam (Lithic Torriorthents - loamy-skeletal, mixed, mesic)—4 percent

*Inclusion 3:* Urban sand—3 percent

*Inclusion 4:* Rock outcrop—2 percent

#### *Wedekind Soil*

*Position on landscape:* North- and east-facing back slopes of mountains and hills

*Parent material:* Kind—colluvium residuum; source—andesite

*Dominant present vegetation:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—grave, percentage of surface covered—50

##### *Typical profile:*

0 to 7 inches—gravelly loam; 0 to 5 percent cobbles and 35 to 50 percent pebbles (by weight), granular structure; soft, very friable; slightly acid (pH 6.4); nonsaline (less than 2 mmhos/cm) nonsodic (SAR of less than 3); estimated Unified classification—SM, estimated AASHTO classification—A-2, A-4

7 to 13 inches—gravelly sandy clay loam, sandy clay loam, clay loam; 0 to 5 percent cobbles and 10 to 45 percent pebbles (by weight), subangular blocky structure; slightly hard, friable, neutral (pH 6.8); nonsaline (less than 2 mmhos/cm) nonsodic (SAR of less than 3); estimated Unified classification—SC, estimated AASHTO classification—A-2, A-6

13 inches—weathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately rapid

*Available water capacity:* 2.5 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.24, T value—1, wind erodibility group—4

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### *Xman Soil*

*Position on landscape:* South- and west-facing back slopes and ridges of mountains and hills

*Parent material:* Kind—colluvium, residuum; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—90

*Typical profile*

0 to 2 inches—very stony loam; 20 to 50 percent cobbles and stones and 25 to 35 percent pebbles (by weight); platy structure, slightly hard, friable neutral (pH 6.8), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-2, A-4

2 to 14 inches—gravelly clay, clay, 0 to 10 percent cobbles and 0 to 30 percent pebbles (by weight); prismatic structure; hard, firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13); estimated Unified classification—CH; estimated AASHTO classification—A-7

14 to 29 inches—weathered andesite

29 inches—unweathered andesite

*Range in depth to bedrock:* 10 to 20 inches to weathered bedrock; 20 to 40 inches to hard bedrock

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.32; T value—1, wind erodibility group—8

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

#### *Indiana Soil*

*Position on landscape:* Concave, north- and east-facing back slopes of mountains and hills

*Parent material:* Kind—colluvium, residuum; source—andesite

*Dominant present vegetation:* Wyoming big sagebrush, Thurber needlegrass, antelope bitterbrush

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—80

*Typical profile*

0 to 13 inches—stony sandy loam; 20 to 25 percent cobbles and stones and 20 to 35 percent pebbles (by weight); subangular blocky structure; soft, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-1, A-2

13 to 33 inches—clay loam, gravelly clay loam, sandy clay loam; 0 to 15 percent cobbles and stones and 15 to 40 percent pebbles (by weight); subangular blocky structure; hard, friable neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, GC; estimated AASHTO classification—A-2, A-6, A-7

33 inches—unweathered andesite

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 5 inches

*Water supplying capacity:* 11 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.32; T value—2, wind erodibility group—4

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—north- and east-facing back slopes and ridges of mountains and hills; contrasting features—receives higher precipitation because of its position, receives additional moisture from runoff; distinctive present vegetation—low sagebrush, antelope bitterbrush

*Inclusion 2:* Position on landscape—convex south- and west-facing back slopes of mountains and hills; contrasting features—severely eroded areas, droughty; distinctive present vegetation—purple sage

*Inclusion 3:* Position on landscape—disturbed areas

*Inclusion 4:* Position on landscape—ridges and back slopes of mountains and hills; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

#### **Major Uses**

Rangeland, wildlife habitat, urban development

## Potential Native Plant Community (Table 7)

### Elements of Wildlife Habitat

#### *Suitability of Wedekind soil for named elements:*

- Wild herbaceous plants (nonirrigated)—poor
- Shrubs (nonirrigated)—poor

#### *Suitability of Xman soil for named elements:*

- Wild herbaceous plants (nonirrigated)—poor
- Shrubs (nonirrigated)—poor

#### *Suitability of Indiano soil for named elements:*

- Wild herbaceous plants (nonirrigated)—fair
- Shrubs (nonirrigated)—fair

### Ratings for Selected Uses

#### *(Wedekind Soil)*

##### *Suitability and limitations for the following uses—*

- Rangeland seeding: Poor—droughty, erodes easily
- Shallow excavations: Severe—depth to rock, slope
- Local roads and streets: Severe—slope

#### *(Xman Soil)*

##### *Suitability and limitations for the following use—*

- Rangeland seeding: Poor—droughty, large stones, erodes easily
- Shallow excavations: Severe—depth to rock, slope
- Local roads and streets: Severe—low strength, slope, shrink-swell

#### *(Indiano Soil)*

##### *Suitability and limitations for the following use—*

- Range and seeding: Poor—large stones, erodes easily
- Shallow excavations: Severe—depth to rock, slope
- Local roads and streets: Severe—slope

### Interpretive Groups

*Capability classification:* Wedekind soil—VIIe, nonirrigated; Xman soil—VIIc, nonirrigated; Indiano soil—VIIc, nonirrigated

*Range site symbol:* Wedekind soil—026X015N, Xman soil—026X025N, Indiano soil—026X010N

## 120—Springmeyer-Reno association

### Map Unit Setting

*Position on landscape:* Fans, fan remnants

*Elevation:* 6,000 to 6,500 feet

*Climatic data (average annual)*

- Precipitation—about 11 inches
- Air temperature—about 49 degrees F
- Frost-free season—about 100 days

### Composition

*Springmeyer gravelly loam, 8 to 15 percent slopes (Andic Argixerolls - fine-loamy, mixed, mesic)—65 percent*

*Reno cobbly fine sandy loam, 4 to 15 percent slopes (Abruptic Xerollic Durargids - fine, montmorillonitic, mesic)—20 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Xerollic Paleargids (Xerollic Paleargids - fine, montmorillonitic, mesic)—10 percent

*Inclusion 2:* Andic Haploxerolls (Andic Haploxerolls - loamy-skeletal, mixed, mesic)—3 percent

*Inclusion 3:* Aquic Haploxerolls (Aquic Haploxerolls - coarse-loamy mixed, mesic)—2 percent

### Springmeyer Soil

*Position on landscape:* Alluvial fans

*Parent material:* Kind—alluvium, source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—grave, percentage of surface covered—50

*Typical profile:*

0 to 6 inches—gravelly loam, 0 to 5 percent cobbles and 25 to 45 percent pebbles (by weight), subangular blocky structure, slightly hard, very friable; neutral (pH 6.8); nonsaline (less than 3 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SM, SM-SC, estimated AASHTO classification—A-2, A-4  
6 to 60 inches or more—clay loam, gravelly sandy clay loam, 0 to 5 percent cobbles and 15 to 35 percent pebbles (by weight), prismatic structure parting to subangular blocky, hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SC, CL, estimated AASHTO classification—A-2, A-3, A-7

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 9 inches

*Water supplying capacity:* 11 inches

*Runoff:* Medium

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.32, T value—5; wind erodibility group—5

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—high to concrete—low

*Potential frost action:* Moderate

### Reno Soil

*Position on landscape:* Upper part of fan remnants

*Parent material:* Kind—alluvium, source—various kinds of rock

**Dominant present vegetation:** Low sagebrush, antelope bitterbrush, Thurber needlegrass

**Rock fragments on surface:** Kind—gravel, cobbles, percentage of surface covered—80

**Typical profile:**

0 to 3 inches—cobbly fine sandy loam; 15 to 30 percent cobbles and 10 to 35 percent pebbles (by weight); platy structure; hard, very friable, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-1, A-2

3 to 32 inches—clay sandy clay, gravelly clay; 0 to 5 percent cobbles and 5 to 30 percent pebbles (by weight); prismatic structure; very hard, very firm, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—CL, SC, CH; estimated AASHTO classification—A-7

32 to 44 inches—indurated hardpan

44 to 60 inches or more—very gravelly loamy sand, extremely gravelly loamy sand, 5 to 10 percent cobbles and stones and 50 to 80 percent pebbles (by weight); massive, slightly hard, very friable, moderately alkaline (pH 8.2); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, GP-GM; estimated AASHTO classification—A-1

**Range in depth to hardpan:** 20 to 40 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Very slow

**Available water capacity:** 4 inches

**Water supplying capacity:** 10 inches

**Runoff:** Medium

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.17, T value—2; wind erodibility group—4

**Hazard of erosion:** By water—slight, by wind—slight

**Shrink-swell potential:** High

**Corrosivity:** To steel—high, to concrete—low

**Potential frost action:** Moderate

**Contrasting Inclusions**

**Inclusion 1:** Position on landscape—lower fan remnants, contrasting feature—very deep clay, distinctive present vegetation—low sagebrush, antelope bitterbrush, Thurber needlegrass

**Inclusion 2:** Position on landscape—inset fans, contrasting feature—very gravelly throughout the profile; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

**Inclusion 3:** Position on landscape—stream terraces, contrasting features—wetness, thick dark-colored

upper layer; distinctive present vegetation—low basin wildrye, creeping wildrye

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 8)**

**Elements of Wildlife Habitat**

**Suitability of Springmeyer soil for named elements:**

Wild herbaceous plants (nonirrigated)—fair  
Shrubs (nonirrigated)—fair

**Suitability of Reno soil for named elements:**

Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

**Ratings for Selected Uses**

*(Springmeyer Soil)*

**Suitability and limitation for the following use—**

Rangeland seeding: Fair—small stones

*(Reno Soil)*

**Suitability and limitation for the following use—**

Rangeland seeding: Poor—rooting depth

**Interpretive Groups**

**Capability classification:** Springmeyer soil—V1c, nonirrigated, Reno soil—V1ls, nonirrigated

**Range site symbol:** Springmeyer soil—026X010N, Reno soil—026X023N

**135—Oppio-Nosrac association**

**Map Unit Setting**

**Position on landscape:** Mountains

**Elevation:** 5,500 to 6,500 feet

**Climatic data (average annual):**

Precipitation—about 12 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

**Composition**

**Oppio very stony fine sandy loam, 30 to 50 percent slopes (Xerollic Haplargids - fine, montmorillonitic, mesic)—70 percent**

**Nosrac stony fine sandy loam, 30 to 50 percent slopes (Andic Argixerolls - loamy-skeletal mixed, mesic)—20 percent**

**Contrasting inclusions as follows—**

**Inclusion 1:** Devada very cobbly loam, 15 to 50 percent slopes (Lithic Argixerolls - clayey, montmorillonitic, mesic)—5 percent

**Inclusion 2:** Rock outcrop—5 percent

*Oppio Soil*

**Position on landscape:** South- and west-facing back slopes of mountains

**Parent material:** Kind—colluvium, residuum; source—andesite

**Dominant present vegetation:** Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

**Rock fragments on surface:** Kind—gravel, cobbles, stones, percentage of surface covered—90

**Typical profile:**

0 to 6 inches—very stony fine sandy loam, 25 to 35 percent cobbles and stones and 35 to 55 percent pebbles (by weight); platy structure; hard, friable; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-1, A-2

6 to 27 inches—gravelly clay, 0 to 5 percent cobbles and stones and 40 to 50 percent pebbles (by weight); prismatic structure; extremely hard, very firm; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-7

27 inches—unweathered andesite

**Range in depth to bedrock:** 20 to 40 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Slow

**Available water capacity:** 3.6 inches

**Water supplying capacity:** 8 inches

**Runoff:** Rapid

**Hydrologic group:** C

**Erosion factors (upper layer):** K value—0.28; T value—2; wind erodibility group—8

**Hazard of erosion:** By water—severe; by wind—slight

**Shrink-swell potential:** High

**Corrosivity:** To steel—high; to concrete—moderate

**Potential frost action:** Moderate

*Nosrac Soil*

**Position on landscape:** North-facing back slopes of mountains

**Parent material:** Kind—colluvium, residuum; source—basalt andesite

**Dominant present vegetation:** Mountain big sagebrush, antelope bitterbrush, western needlegrass

**Rock fragments on surface:** Kind—gravel, cobbles, stones, percentage of surface covered—60

**Typical profile:**

0 to 6 inches—stony fine sandy loam; 5 to 20 percent cobbles and stones and 35 to 45 percent pebbles (by weight); granular structure; soft, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3);

estimated Unified classification—SM-SC, estimated AASHTO classification—A-2

6 to 52 inches—very gravelly clay loam; 5 to 25 percent cobbles and stones and 50 to 60 percent pebbles (by weight); subangular blocky structure; very hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-2

52 to 60 inches or more—very gravelly loam; 10 to 25 percent cobbles and stones and 50 to 70 percent pebbles (by weight); massive; hard friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-2, A-6

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 6.6 inches

**Water supplying capacity:** 11 inches

**Runoff:** Rapid

**Hydrologic group:** B

**Erosion factors (upper layer):** K value—0.24; T value—5; wind erodibility group—8

**Hazard of erosion:** By water—severe; by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—high; to concrete—low

**Potential frost action:** Moderate

*Contrasting Inclusions*

**Inclusion 1:** Position on landscape—convex shoulders and ridgelines of mountains; contrasting feature—bedrock at a depth of less than 20 inches; distinctive present vegetation—low sagebrush, antelope bitterbrush, Thurber needlegrass

**Inclusion 2:** Position on landscape—ridges and convex back slopes of mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 9)****Elements of Wildlife Habitat**

**Suitability of Oppio soil for named elements:**

Wild herbaceous plants (nonirrigated)—fair  
Shrubs (nonirrigated)—fair

**Suitability of Nosrac soil for named elements:**

Wild herbaceous plants (nonirrigated)—fair  
Shrubs (nonirrigated)—fair



**Ratings for Selected Uses***(Oppio Soil)**Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, erodes easily

*(Nosrac Soil)**Suitability and limitation for the following use—*

Rangeland seeding: Poor—erodes easily

**Interpretive Groups***Capability classification:* Oppio soil—Vils, nonirrigated; Nosrac soil—Vils, nonirrigated*Range site symbol:* Oppio soil—026X025N; Nosrac soil—026X005N**137—Oppio-Reywat-Indiano association****Map Unit Setting***Position on landscape:* Hills, mountains*Elevation:* 5,800 to 6,200 feet*Climatic data (average annual):*

Precipitation—about 11 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

**Composition***Oppio very stony loam, 4 to 15 percent slopes (Xerollic Haplargids - fine, montmorillonitic, mesic)—40 percent**Reywat stony loam, 30 to 50 percent slopes (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—30 percent**Indiano stony sandy loam, 15 to 50 percent slopes (Aridic Argixerolls - fine-loamy, mixed, mesic)—15 percent**Contrasting inclusions as follows—**Inclusion 1:* Aridic Argixerolls (Aridic Argixerolls - fine-loamy mixed, mesic)—10 percent*Inclusion 2:* Rock outcrop—5 percent*Oppio Soil**Position on landscape:* South- and west-facing back slopes of hills and mountains*Parent material:* Kind—colluvium, residuum, source—andesite*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush, squirreltail*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90*Typical profile*

0 to 2 inches—very stony loam; 25 to 35 percent cobbles and stones and 35 to 55 percent pebbles (by weight); platy structure; hard, friable; mildly alkaline (pH 7.6); nonsaline (less than 2

mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM, estimated AASHTO classification—A-2, A-4

2 to 26 inches—gravelly clay, 0 to 5 percent cobbles and stones and 40 to 50 percent pebbles (by weight); prismatic structure; extremely hard, very firm, mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-7

26 inches—unweathered andesite

*Range in depth to bedrock:* 20 to 40 inches*Depth to seasonal high water table:* More than 60 inches*Hazard of flooding:* None*Permeability:* Slow*Available water capacity:* 3.5 inches*Water supplying capacity:* 8 inches*Runoff:* Rapid*Hydrologic group:* C*Erosion factors (upper layer):* K value—0.28; T value—2; wind erodibility group—8*Hazard of erosion:* By water—severe; by wind—slight*Shrink-swell potential:* High*Corrosivity:* To steel—high; to concrete—moderate*Potential frost action:* Moderate*Reywat Soil**Position on landscape:* Ridges adjacent to Rock outcrop and upper part of back slopes of hills and mountains*Parent material:* Kind—residuum, colluvium; source—basalt*Dominant present vegetation:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—80*Typical profile*

0 to 5 inches—stony loam; 15 to 30 percent cobbles and stones and 30 to 45 percent pebbles (by weight); subangular blocky structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, SM; estimated AASHTO classification—A-4

5 to 15 inches—very gravelly clay loam, very gravelly loam; 10 to 20 percent cobbles and stones and 45 to 65 percent pebbles (by weight); subangular blocky structure; hard, firm, mildy alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2, A-6

15 inches—unweathered basalt

*Range in depth to bedrock:* 10 to 20 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 2 inches

**Water supplying capacity:** 7 inches

**Runoff:** Rapid

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.17; T value—1; wind erodibility group—6

**Hazard of erosion:** By water—moderate, by wind—slight

**Shrink-swell potential:** Moderate

**Corrosivity:** To steel—moderate; to concrete—low

**Potential frost action:** Moderate

#### *Indiana Soil*

**Position on landscape:** Concave, north- and east-facing back slopes of hills and mountains

**Parent material:** Kind—colluvium, residuum, source—andesite

**Dominant present vegetation:** Wyoming big sagebrush, Thurber needlegrass, antelope bitterbrush

**Rock fragments on surface:** Kind—gravel, cobbles, stones, percentage of surface covered—80

#### *Typical profile*

0 to 13 inches—stony sandy loam; 20 to 25 percent cobbles and stones and 20 to 35 percent pebbles (by weight); subangular blocky structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM, estimated AASHTO classification—A-1, A-2

13 to 33 inches—clay loam, gravelly clay loam, sandy clay loam; 0 to 15 percent cobbles and stones and 15 to 40 percent pebbles (by weight); subangular blocky structure; hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, GC; estimated AASHTO classification—A-2, A-6, A-7

33 inches—unweathered andesite

**Range in depth to bedrock:** 20 to 40 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 5 inches

**Water supplying capacity:** 11 inches

**Runoff:** Rapid

**Hydrologic group:** C

**Erosion factors (upper layer):** K value—0.32; T value—2; wind erodibility group—4

**Hazard of erosion:** By water—severe; by wind—slight

**Shrink-swell potential:** Moderate

**Corrosivity:** To steel—moderate; to concrete—low

**Potential frost action:** Moderate

#### *Contrasting Inclusions*

**Inclusion 1:** Position on landscape—top slopes of hills; contrasting features—less than 35 percent gravel throughout the profile, higher water supplying capacity; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

**Inclusion 2:** Position on landscape—ridges and convex back slopes of hills and mountains, contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

#### **Major Uses**

**Current uses:** Rangeland, wildlife habitat

**Potential foreseeable use:** Homesites

#### **Potential Native Plant Community (Table 10)**

#### **Elements of Wildlife Habitat**

**Suitability of Oppio soil for named elements.**

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

**Suitability of Reywat soil for named elements.**

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

**Suitability of Indiana soil for named elements.**

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

#### **Ratings for Selected Uses**

*(Oppio Soil)*

**Suitability and limitations for the following uses—**

Rangeland seeding: Poor—large stones

Shallow excavations: Severe—depth to rock

Local roads and streets: Severe—shrink-swell

*(Reywat Soil)*

**Suitability and limitations for the following uses—**

Rangeland seeding: Poor—droughty small stones, erodes easily

Shallow excavations: Severe—depth to rock, slope

Local roads and streets: Severe—depth to rock, slope

*(Indiana Soil)*

**Suitability and limitations for the following uses—**

Rangeland seeding: Poor—slope

Shallow excavations: Severe—depth to rock, slope

Local roads and streets: Severe—slope

#### **Interpretive Groups**

**Capability classification:** Oppio soil—VIs, nonirrigated;

Reywat soil—VIIIs, nonirrigated; Indiana soil—VIIs, nonirrigated

**Range site symbol:** Oppio soil—026X025N, Reywat soil—026X015N, Indiana soil—026X010N

**150—Tristan-Duco-Zephan association****Map Unit Setting***Position on landscape:* Mountains*Elevation:* 5,500 to 6,000 feet*Climatic data (average annual):*

Precipitation—about 11 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

**Composition***Tristan very stony loam, 30 to 50 percent slopes (Andic Argixerolls - loamy-skeletal, mixed, mesic)—45 percent**Duco extremely stony loam, 30 to 50 percent slopes (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—25 percent**Zephan extremely cobbly loam, 30 to 50 percent slopes (Xerollic Haplargids - clayey-skeletal, montmorillonitic, mesic)—15 percent**Contrasting inclusions as follows—**inclusion 1: Old Camp extremely stony loam, 30 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—5 percent**inclusion 2: Aridic Haploxerolls (Andic Haploxerolls - loamy-skeletal, mixed, mesic)—5 percent**inclusion 3: Rock outcrop—5 percent***Tristan Soil***Position on landscape:* Concave back slopes of mountains*Parent material:* Kind—colluvium, residuum; source—andesite*Dominant present vegetation:* Mountain big sagebrush, antelope bitterbrush, western needlegrass*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—90*Typical profile*

0 to 7 inches—very stony loam, 30 to 50 percent cobbles and stones and 35 to 50 percent pebbles (by weight); granular structure; slightly hard, friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM-GC, estimated AASHTO classification—A-2, A-4

7 to 20 inches—very gravelly clay loam, very cobbly clay loam, 30 to 50 percent cobbles and stones and 30 to 65 percent pebbles (by weight); subangular blocky structure; hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, SC, CL, estimated AASHTO classification—A-2, A-6

20 to 49 inches—extremely cobbly sandy clay loam, extremely cobbly loam, 55 to 75 percent cobbles

and stones and 55 to 65 percent pebbles (by weight); subangular blocky structure; hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-2

49 inches—weathered bedrock

*Range in depth to bedrock:* 40 to 60 inches*Depth to seasonal high water table:* More than 60 inches*Hazard of flooding:* None*Permeability:* Moderately slow*Available water capacity:* 3 inches*Water supplying capacity:* 9 inches*Runoff:* Rapid*Hydrologic group:* B*Erosion factors (upper layer):* K value—0.28, T value—3; wind erodibility group—8*Hazard of erosion:* By water—severe, by wind—slight*Shrink-swell potential:* Moderate*Corrosivity:* To steel—moderate to concrete—low*Potential frost action:* Moderate**Duco Soil***Position on landscape:* Ridges and back slopes of mountains*Parent material:* Kind—colluvium, residuum, source—andesite*Dominant present vegetation:* Singleleaf pinyon, Utah juniper*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—90*Typical profile*

0 to 5 inches—extremely stony loam, 35 to 55 percent cobbles and stones and 25 to 50 percent pebbles (by weight); platy structure; soft, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM-SC, GM-GC, estimated AASHTO classification—A-2, A-4

5 to 19 inches—extremely cobbly sandy clay loam, very gravelly clay loam, 15 to 55 percent cobbles and stones and 45 to 70 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-2

19 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches*Depth to seasonal high water table:* More than 60 inches*Hazard of flooding:* None*Permeability:* Moderately slow*Available water capacity:* 1 inch*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.15; T value—  
1, wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### *Zephan Soil*

*Position on landscape:* Lower part of back slopes of mountains

*Parent material:* Kind—colluvium, source—andesite

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile:*

0 to 8 inches—extremely cobbly loam; 40 to 45 percent cobbles and 50 to 70 percent pebbles (by weight); platy structure; slightly hard, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—GM, estimated AASHTO classification—A-1, A-2

8 to 35 inches—very cobbly clay; 30 to 40 percent cobbles and 30 to 40 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—GC, CH, estimated AASHTO classification—A-7

35 to 42 inches—weathered bedrock

42 inches—unweathered bedrock

*Range in depth to bedrock:* 25 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 4 inches

*Water supplying capacity:* 8.5 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.10; T value—  
2, wind erodibility group—8

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate, to concrete—moderate

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—lower part of ridges of mountains, contrasting feature—light-colored upper layer; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 2:* Position on landscape—concave back slopes of mountains, contrasting features—very deep, loamy; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 3:* Position on landscape—ridges and convex back slopes of mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 11)**

##### **Woodland**

*(Duco Soil)*

*Site index for common trees:* Utah juniper—35  
singleleaf pinyon—35

*Most important native understory plants:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

##### **Elements of Wildlife Habitat**

*Suitability of Tristan soil for named elements:*

Wild herbaceous plants (nonirrigated)—fair  
Shrubs (nonirrigated)—fair

*Suitability of Duco soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor  
Coniferous plants (nonirrigated)—very poor  
Shrubs (nonirrigated)—poor

*Suitability of Zephan soil for named elements:*

Wild herbaceous plants (nonirrigated)—fair  
Shrubs (nonirrigated)—fair

#### **Ratings for Selected Uses**

*(Tristan Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, erodes easily

*(Duco Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, erodes easily, droughty

*(Zephan Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, slope

#### **Interpretive Groups**

*Capability classification:* Tristan soil—VII<sub>s</sub>, nonirrigated;  
Duco soil—VII<sub>s</sub>, nonirrigated; Zephan soil—VI<sub>s</sub>,  
nonirrigated

*Range site symbol:* Tristan soil—026X048N, Zephan  
soil—026X025N

*Woodland suitability group:* Duco soil—1r

### 151—Tristan-Burnborough-Gabica association

#### Map Unit Setting

*Position on landscape:* Mountains

*Elevation:* 6,500 to 7,200 feet

*Climatic data (average annual):*

Precipitation—about 14 inches

Air temperature—about 45 degrees F

Frost free season—about 80 days

#### Composition

*Tristan very stony loam, 30 to 50 percent slopes (Aridic Argixerolls - loamy-skeletal, mixed, mesic)—40 percent*

*Burnborough very gravelly loam, 50 to 75 percent slopes (Aridic Argixerolls - loamy-skeletal, mixed, frigid)—30 percent*

*Gabica cobbly loam, 15 to 30 percent slopes (Lithic Argixerolls - loamy-skeletal, mixed, frigid)—15 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Lithic Haploxerolls (Lithic Haploxerolls - loamy-skeletal, mixed, frigid)—10 percent

*Inclusion 2:* Rock outcrop—3 percent

*Inclusion 3:* Rubble land—2 percent

#### Tristan Soil

*Position on landscape:* South- and west-facing back slopes of mountains

*Parent material:* Kind—residuum, colluvium, source—andesite

*Dominant present vegetation:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile:*

0 to 9 inches—very stony loam; 30 to 50 percent cobbles and stones and 35 to 50 percent pebbles (by weight); granular structure; slightly hard, friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GM-GC, estimated AASHTO classification—A-2, A-4

9 to 36 inches—very gravelly clay loam, very cobbly clay loam; 30 to 50 percent cobbles and stones and 30 to 65 percent pebbles (by weight), subangular blocky structure; hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GC, SC, CL, estimated AASHTO classification—A-2, A-6

36 to 54 inches—extremely cobbly loam; 55 to 75 percent cobbles and stones and 55 to 65 percent

pebbles (by weight), subangular blocky structure; hard, friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GC, estimated AASHTO classification—A-2

54 inches—weathered bedrock

*Range in depth to bedrock:* 40 to 60 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 3 inches

*Water supplying capacity:* 9 inches

*Runoff:* Rapid

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.28 T value—3; wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### Burnborough Soil

*Position on landscape:* North- and east-facing back slopes of mountains

*Parent material:* Kind—residuum, colluvium, source—andesite

*Dominant present vegetation:* Mountain big sagebrush, antelope bitterbrush, western needlegrass

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—50

*Typical profile:*

0 to 17 inches—very gravelly loam, 5 to 10 percent cobbles and stones and 45 to 60 percent pebbles (by weight); subangular blocky structure; soft, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—SC, SM SC, estimated AASHTO classification—A-2

17 to 60 inches or more—very gravelly loam, very gravelly clay loam, 15 to 25 percent cobbles and stones and 40 to 65 percent pebbles (by weight); massive; hard, friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GC, SC, estimated AASHTO classification—A-2

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 6 inches

*Water supplying capacity:* 11 inches

*Runoff:* Very rapid

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.24 T value—5; wind erodibility group—7

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

### Gabica Soil

*Position on landscape:* Ridges of mountains

*Parent material:* Kind—residuum; source—andesite

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, percentage of surface covered—90

*Typical profile:*

0 to 5 inches—cobbley loam, 5 to 20 percent cobbles and 30 to 50 percent pebbles (by weight); subangular blocky structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-4

5 to 19 inches—very gravelly loam, very stony clay loam, 10 to 50 percent cobbles and stones and 50 to 75 percent pebbles (by weight); subangular blocky structure; hard-firm, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2, A-6

19 inches—unweathered bedrock

*Range in depth to bedrock:* 12 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1 inch

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.24; T value—1, wind erodibility group—B

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Moderate

### Contrasting Inclusions

*Inclusion 1:* Position on landscape—crests of mountains, contrasting feature—no argillic horizon; distinctive present vegetation—low sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 2:* Position on landscape—ridges and convex back slopes of mountains, contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

*Inclusion 3:* Position on landscape—plane to concave back slopes of mountains, contrasting feature—

more than 90 percent stones on the surface; distinctive present vegetation—barren

### Major Uses

Rangeland, wildlife habitat

### Potential Native Plant Community (Table 12)

#### Elements of Wildlife Habitat

*Suitability of Tristan soil for named elements:*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Burnborough soil for named elements:*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Gabica soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### Ratings for Selected Uses

*(Tristan Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones erode easily

*(Burnborough Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—small stones erode easily

*(Gabica Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Poor—droughty

#### Interpretive Groups

*Capability classification:* Tristan soil—VI s, nonirrigated

Burnborough soil—VI s, nonirrigated; Gabica soil—VII s, nonirrigated

*Range site symbol:* Tristan soil—026X010N

Burnborough soil—026X005N; Gabica soil—026X028N

### 160—Devada-Rock outcrop complex, 15 to 50 percent slopes

#### Map Unit Setting

*Position on landscape:* Foothills, hills

*Elevation:* 4,500 to 5,000 feet

*Climatic data (average annual):*

Precipitation—about 12 inches

Air temperature—about 50 degrees F

Frost-free season—about 110 days

**Composition**

*Devada very cobbly loam, 15 to 50 percent slopes (Lithic Argixerolls - clayey, montmorillonitic, mesic)*—70 percent

*Rock outcrop*—20 percent

*Contrasting inclusions as follows—*

*Inclusion 1:* Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—8 percent

*Inclusion 2:* Rubble land—2 percent

*Devada Soil*

*Position on landscape:* Back slopes of hills and foothills

*Parent material:* Kind—residuum, colluvium, source—andesite

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, percentage of surface covered—80

*Typical profile:*

0 to 4 inches—very cobbly loam; 30 to 65 percent cobbles and 30 to 50 percent pebbles (by weight); granular structure; slightly hard, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, SC, GM-GC, SM-SC; estimated AASHTO classification—A-2, A-4, A-6

4 to 13 inches—gravelly clay clay; 0 to 5 percent cobbles and 0 to 45 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CH, GC; estimated AASHTO classification—A-7

13 inches—unweathered bedrock

*Range in depth to bedrock:* 12 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7.5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.15; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

*Rock Outcrop*

*Position on landscape:* Crests and escarpments of hills

*Dominant present vegetation:* Barren

*Contrasting Inclusions*

*Inclusion 1:* Position on landscape—concave back slopes of hills; contrasting feature—gravelly loam or very gravelly clay loam throughout the profile; dominant present vegetation—big sagebrush

*Inclusion 2:* Position on landscape—plane to concave back slopes below escarpments of hills; contrasting feature—more than 90 percent stones on the surface; dominant present vegetation—barren

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 13)****Elements of Wildlife Habitat**

*Suitability of Devada soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Ratings for Selected Uses**

*(Devada Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, large stones

**Interpretive Groups**

*Capability classification:* Devada soil—V e nonirrigated, Rock outcrop—V i s

*Range site symbol:* Devada soil—028X023N

**161—Devada-Nosrac association****Map Unit Setting**

*Position on landscape:* Hills, plateaus

*Elevation:* 6,000 to 6,700 feet

*Climatic data (average annual):*

Precipitation—about 12 inches

Air temperature—about 48 degrees F

Frost-free season—about 100 days

**Composition**

*Devada very stony loam, 8 to 30 percent slopes (Lithic Argixerolls - clayey, montmorillonitic, mesic)*—50 percent

*Nosrac extremely stony loam, 30 to 50 percent slopes (Aridic Argixerolls - loamy-skeletal, mixed, mesic)*—35 percent

*Contrasting inclusions as follows—*

*Inclusion 1:* Heywat stony loam (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—5 percent

*Inclusion 2:* Lister very stony sandy loam (Aridic Argixerolls - loamy-skeletal, mixed, mesic)—5 percent



*Inclusion 3:* Rock outcrop—5 percent

*Devada Soil*

*Position on landscape:* Basalt plateaus, side slopes of hills

*Parent material:* Kind—residuum; source—basalt

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—cobbles, stones, percentage of surface covered—85

*Typical profile*

0 to 4 inches—very stony loam, 25 to 60 percent cobbles and stones and 0 to 10 percent pebbles (by weight), granular structure; slightly hard, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—CL, SC, CL-ML, SM-SC; estimated AASHTO classification—A-4, A-6

4 to 13 inches—gravelly clay, clay; 0 to 5 percent cobbles and stones and 0 to 45 percent pebbles (by weight), subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—CH, GC; estimated AASHTO classification—A-7

13 inches—unweathered bedrock

*Range in depth to bedrock:* 12 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

*Nostrac Soil*

*Position on landscape:* North- and east-facing back slopes of hills and plateaus

*Parent material:* Kind—colluvium residuum; source—basalt, andesite

*Dominant present vegetation:* Mountain big sagebrush, antelope bitterbrush, western needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—70

*Typical profile*

0 to 8 inches—extremely stony loam, 30 to 40 percent cobbles and stones and 20 to 30 percent pebbles (by weight); granular structure; slightly

hard, friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, estimated AASHTO classification—A-6

8 to 27 inches—very gravelly clay loam, very cobbly clay loam; 5 to 60 percent cobbles and stones and 60 to 70 percent pebbles (by weight), subangular blocky structure; hard, firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GC; estimated AASHTO classification—A-2

27 to 60 inches or more—very gravelly clay loam, 6 to 10 percent cobbles and stones and 50 to 60 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GC; estimated AASHTO classification—A-2

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 6 inches

*Water supplying capacity:* 11 inches

*Runoff:* Rapid

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.28; T value—5; wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

*Contrasting Inclusions*

*Inclusion 1:* Position on landscape—north-facing back slopes of hills and plateaus; contrasting features—slopes of less than 8 percent, gravelly loam or clay loam throughout the profile; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 2:* Position on landscape—convex, north-facing back slopes of hills and plateaus; contrasting feature—bedrock at a depth of 20 to 40 inches; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 3:* Position on landscape—ridges and convex back slopes of hills; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 14)****Elements of Wildlife Habitat***Suitability of Devada soil for named elements.*

- Wild herbaceous plants (nonirrigated)—poor
- Shrubs (nonirrigated)—poor

*Suitability of Nosrac soil for named elements.*

- Wild herbaceous plants (nonirrigated)—fair
- Shrubs (nonirrigated)—fair
- Coniferous plants (nonirrigated)—fair

**Ratings for Selected Uses***(Devada Soil,**Suitability and limitations for the following use—*

- Rangeland seeding: Poor—large stones, droughty

*(Nosrac Soil)**Suitability and limitations for the following use—*

- Rangeland seeding: Poor—large stones, erodes easily

**Interpretive Groups**

*Capability classification.* Devada soil—VIfc, nonirrigated; Nosrac soil—VIfs, nonirrigated

*Range site symbol:* Devada soil—026X023N; Nosrac soil—026X005N

**152—Devada-Olac-Old Camp association****Map Unit Setting**

*Position on landscape.* Mountains

*Elevation:* 5,000 to 6,000 feet

*Climatic data (average annual):*

- Precipitation—about 10 inches
- Air temperature—about 49 degrees F
- Frost-free season—about 100 days

**Composition**

*Devada very stony loam, 4 to 15 percent slopes (Lithic Argixerolls - clayey, montmorillonitic, mesic)—40 percent*

*Olac very gravelly sandy loam, 15 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—30 percent*

*Old Camp extremely stony loam, 15 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—15 percent*

*Contrasting inclusions as follows—*

- Inclusion 1:* Rock outcrop—6 percent
- Inclusion 2:* Rubble and—6 percent
- Inclusion 3:* Veta very gravelly sandy loam (Xerollic Camborthids - loamy-skeletal, mixed, mesic)—3 percent

**Devada Soil**

*Position on landscape:* Broad crests and lower side slopes of mountains

*Parent material:* Kind—residuum; colluvium, source—andesite

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—cobbles, stones; percentage of surface covered—60

*Typical profile:*

0 to 4 inches—very stony loam; 25 to 60 percent cobbles and stones and 0 to 10 percent pebbles (by weight), granular structure; slightly hard, very friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, SM-SC, CL-ML, estimated AASHTO classification—A-4, A-6

4 to 13 inches—gravelly clay, clay; 0 to 5 percent cobbles and stones and 0 to 45 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CH, GC; estimated AASHTO classification—A-7

13 inches—unweathered bedrock

*Range in depth to bedrock:* 12 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2.5 inches

*Water supplying capacity:* 8 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17, T value—1; wind erodibility group—8

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Low

**Olac Soil**

*Position on landscape:* Back slopes and crests of mountains

*Parent material:* Kind—residuum; source—andesite, basalt

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—70

*Typical profile:*

0 to 3 inches—very stony sandy loam; 30 to 55 percent cobbles and 30 to 50 percent pebbles (by weight), granular structure; slightly hard, very friable; neutral (pH 6.8), nonsaline (less than 2

mmhos/cm) nonsodic (SAR of less than 3), estimated Unified classification—GM, SM, GM-GC, SM-SC; estimated AASHTO classification—A-1, A-2

3 to 10 inches—extremely gravelly loam, extremely gravelly clay loam; 10 to 20 percent cobbles and stones and 65 to 80 percent pebbles (by weight), subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1 inch

*Water supplying capacity:* 6 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—5

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### *Old Camp Soil*

*Position on landscape:* Back slopes of mountains

*Parent material:* Kind—residuum, colluvium; source—andesite

*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile*

0 to 2 inches—extremely stony loam; 25 to 55 percent cobbles and stones and 35 to 45 percent pebbles (by weight); granular structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, SM, GM-GC, SM-SC; estimated AASHTO classification—A-2, A-4

2 to 14 inches—very cobbly clay loam, extremely stony clay loam, very stony clay loam; 35 to 50 percent cobbles and stones and 50 to 65 percent pebbles (by weight); subangular blocky structure; hard, firm, mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2, A-6

14 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 6.5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—ridges and back slopes of mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

*Inclusion 2:* Position on landscape—back slopes of mountains; contrasting feature—more than 90 percent stones on the surface; distinctive present vegetation—barren

*Inclusion 3:* Position on landscape—ravines, drainageways, and draws of mountains; contrasting features—bedrock at a depth of more than 60 inches; receives additional moisture from runoff; distinctive present vegetation—big sagebrush, rabbitbrush, spiny hopsage

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 15)**

#### **Elements of Wildlife Habitat**

*Suitability of Devada soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Olac soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Old Camp soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

#### **Ratings for Selected Uses**

*(Devada Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Poor—large stones

*(Olac Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—small stones, droughty

*(Old Camp Soil)*

*Suitability and limitations for the following use—*

Rangeland seed ng: Poor—large stones, droughty

### Interpretive Groups

*Capability classification:* Devada soil—Vlls, nonirrigated; Otac soil—Vlls, nonirrigated; Old Camp soil—Vlls, nonirrigated

*Range site symbol:* Devada soil—026X023N Otac soil—026X025N Old Camp soil—026X022N

### 170—Saralegui-Isolde association

#### Map Unit Setting

*Position on landscape:* Lake-plain terraces, alluvial fans

*Elevation:* 4,300 to 5,200 feet

*Climatic data (average annual):*

Precipitation—about 7 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

#### Composition

*Saralegui sand, 0 to 4 percent slopes (Xerollic Haplargids - coarse-loamy, mixed, mesic)—45 percent*

*Isolde fine sand, 4 to 15 percent slopes (Typic Torripsamments - mixed, mesic)—40 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Ackley gravelly sandy loam (Xerollic Haplargids - fine-loamy, mixed, mesic)—10 percent

*Inclusion 2:* Badiand—5 percent

#### Saralegui Soil

*Position on landscape:* Lake-plain terraces, alluvial fans

*Parent material:* Kind—alluvium; source—various kinds of rock

*Dominant present vegetation:* Wyoming big sagebrush, needleandthread, Indian ricegrass

*Typical profile.*

0 to 2 inches—sand; 5 to 15 percent pebbles (by weight); single grain; loose; slightly acid (pH 6.5); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—SM, SP-SM; estimated AASHTO classification—A-1, A-2, A-3

2 to 32 inches—sandy loam; 0 to 5 percent pebbles (by weight); subangular blocky structure; soft, very friable; neutral (pH 7.2); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-2, A-4

32 to 60 inches or more—sandy loam, gravelly sandy loam; 0 to 40 percent pebbles (by weight); single grain; loose; mildly alkaline (pH 7.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified

classification—SM; estimated AASHTO classification—A-1, A-2, A-4

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately rapid

*Available water capacity:* 5 inches

*Water supplying capacity:* 7 inches

*Runoff:* Slow

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.10; T value—5; wind erodibility group—1

*Hazard of erosion:* By water—slight; by wind—moderate

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

#### Isolde Soil

*Position on landscape:* Dunes on alluvial fans

*Parent material:* Kind—eolian material; source—various kinds of rock

*Dominant present vegetation:* Hairy horsebrush, fourwing saltbush, Indian ricegrass

*Typical profile*

0 to 3 inches—fine sand; single grain; loose; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SP, SP-SM; estimated AASHTO classification—A-3

3 to 60 inches or more—fine sand; massive soft; very friable; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SP, SP-SM; estimated AASHTO classification—A-3

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Very rapid

*Available water capacity:* 3.6 inches

*Water supplying capacity:* 4 inches

*Runoff:* Very slow

*Hydrologic group:* A

*Erosion factors (upper layer):* K value—0.28; T value—5; wind erodibility group—1

*Hazard of erosion:* By water—slight; by wind—moderate

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Low

#### Contrasting Inclusions

*Inclusion 1:* Position on landscape—alluvial fans; contrasting feature—18 to 27 percent clay between depths of 10 and 34 inches; distinctive present

vegetation: Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass

*Inclusion 2:* Position on landscape—eroded breaks of lake-plain terraces; contrasting feature—severely eroded, distinctive present vegetation—barren

### Major Uses

*Current uses:* Rangeland, wildlife habitat

*Potential foreseeable uses:* Homesites, irrigated crop and

### Potential Native Plant Community (Table 16)

#### Elements of Wildlife Habitat

*Suitability of Saralegui soil for named elements:*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Isalde soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

### Ratings for Selected Uses

*(Saralegui Soil)*

*Suitability and limitations for the following uses—*

Range and seeding: Poor—too sandy

Shallow excavations: Slight

Local roads and streets: Slight

*(Isalde Soil)*

*Suitability and limitations for the following uses—*

Rangeland seeding: Poor—too sandy, too and

Shallow excavations: Severe—cutbanks cave

Local roads and streets: Moderate—slope

### Interpretive Groups

*Capability classification:* Saralegui soil—Ile, irrigated, and vle, nonirrigated; Isalde soil—IVs, irrigated, and VIs, nonirrigated

*Range site symbol:* Saralegui soil—026X020N; Isalde soil—027X023N

### 180—Patna-Badland association

#### Map Unit Setting

*Position on landscape:* Remnants of lake-plain terraces

*Elevation:* 4,300 to 4,400 feet

*Climatic data (average annual):*

Precipitation—about 7 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

#### Composition

*Patna sand, 2 to 25 percent slopes (Typic*

*Haplargids—coarse-loamy, mixed, mesic)—65 percent*

*Badland—20 percent*

#### Contrasting inclusions as follows—

*Inclusion 1:* Isalde fine sand, 4 to 15 percent slopes (Typic Torripsamments—mixed, mesic)—8 percent

*Inclusion 2:* Perazzo very stony sandy loam, 4 to 15 percent slopes (Typic Haplargids—loamy, skeletal, mixed, mesic)—7 percent

#### Patna Soil

*Position on landscape:* Tops of dissected lake-plain terraces

*Parent material:* Kind—alluvium, eolian material, source—various kinds of rock

*Dominant present vegetation:* Indian ricegrass, fourwing saltbush, Nevada dalea, winterfat

#### Typical profile

0 to 7 inches—sand, single grain, loose; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SM, estimated AASHTO classification—A-2

7 to 20 inches—sandy loam, fine sandy loam; subangular blocky structure; soft, very friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—SM-SC, estimated AASHTO classification—A-4

20 to 46 inches—sand, sandy loam, massive, soft, very friable; mildly alkaline (pH 7.6), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13), estimated Unified classification—SP, SM, SM, estimated AASHTO classification—A-2, A-3

46 to 60 inches or more—fine sand, loamy fine sand; single grain, loose; moderately alkaline (pH 8.2), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13), estimated Unified classification—SM, estimated AASHTO classification—A-2

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately rapid

*Available water capacity:* 5.5 inches

*Water supplying capacity:* 7 inches

*Runoff:* Medium

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.15, T value—5; wind erodibility group—1

*Hazard of erosion:* By water—slight, by wind—severe

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high to concrete—low

*Potential frost action:* Low

*Badland*

**Position on landscape:** Side slopes of dissected lake-pain terraces

**Dominant present vegetation:** Barren

*Contrasting Inclusions*

**Inclusion 1:** Position on landscape—leeward side of dunes, contrasting feature—no layer of weak silica accumulation, distinctive present vegetation—hairy horsebrush, fourwing saltbush, Indian ricegrass

**Inclusion 2:** Position on landscape—alluvial fans on lake-pain terraces, contrasting feature—more than 35 percent rock fragments throughout the profile, distinctive present vegetation—shadscale, Bailey greasewood

**Major Uses**

Range and wildlife habitat

**Potential Native Plant Community (Table 17)****Elements of Wildlife Habitat**

**Suitability of Patna soil for named elements.**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

 **Ratings for Selected Uses**

(Patna Soil)

**Suitability and limitations for the following use—**

Range and seeding: Poor—too hard, too sandy

**Interpretive Groups**

**Capability classification:** Patna soil—Vlls, nonirrigated, Badland—Vlls

**Range site symbol:** Patna soil—D27X009N

**210—Theon-Lapon-Olac association****Map Unit Setting**

**Position on landscape:** Hills, mountains

**Elevation:** 5 000 to 6 000 feet

**Climatic data (average annual):**

Precipitation—about 7 inches

Air temperature—about 50 degrees F

Frost-free season—about 20 days

**Composition**

**Theon very gravelly loam, 30 to 75 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—40 percent**

**Lapon very stony loam, 30 to 50 percent slopes (Xerollic Durargids - loamy-skeletal, mixed, mesic)—25 percent**

**Olac very stony loam, 30 to 75 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—20 percent**

**Contrasting inclusions as follows—**

**Inclusion 1:** Singatse very stony sandy loam, 30 to 75 percent slopes (Lithic Torriorthents - loamy skeletal, mixed (calcareous), mesic)—6 percent

**Inclusion 2:** Rock outcrop—4 percent

**Inclusion 3:** Typic Camborthids (Typic Camborthids - loamy-skeletal, mixed, mesic)—3 percent

**Inclusion 4:** Patna sand, 4 to 30 percent slopes (Typic Haplargids - coarse-loamy, mixed, mesic)—2 percent

*Theon Soil*

**Position on landscape:** Back slopes of mountains and hills

**Parent material:** Kind—residual, colluvium source—volcanic rock

**Dominant present vegetation:** Desert needlegrass, brittleleaf horsebrush, Indian ricegrass, shadscale

**Rock fragments on surface:** Kind—gravel, percentage of surface covered—85

**Typical profile.**

0 to 2 inches—very gravelly loam; 5 to 10 percent cobbles and 50 to 70 percent pebbles (by weight), granular structure, soft, very friable, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—GM-GC, GM; estimated AASHTO classification—A-1, A-2

2 to 11 inches—very gravelly clay loam; 5 to 15 percent cobbles and 50 to 70 percent pebbles (by weight), subangular blocky structure, slightly hard, friable; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13); estimated Unified classification—GC; estimated AASHTO classification—A-2

11 inches—unweathered bedrock

**Range in depth to bedrock:** 8 to 14 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 1 inch

**Water supplying capacity:** 5 inches

**Runoff:** Very rapid

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.05, T value—1, wind erodibility group—8

**Hazard of erosion:** By water—moderate, by wind—slight

**Shrink swell potential:** Low

**Corrosivity:** To steel—high, to concrete—low

**Potential frost action:** Low

*Lapon Soil*

**Position on landscape:** Upper side slopes and tops of hills and mountains

**Parent material:** Kind—residuum, colluvium; source—volcanic rock

**Dominant present vegetation:** Low sagebrush, Sandberg bluegrass, Thurber needlegrass

**Rock fragments on surface:** Kind—gravel, cobbles, stones; percentage of surface covered—90

**Typical profile**

0 to 3 inches—very stony loam; 15 to 40 percent cobbles and stones and 50 to 65 percent pebbles (by weight); platy structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM-GC; GM; estimated AASHTO classification—A-2

3 to 12 inches—very gravelly clay loam; 10 to 25 percent cobbles and 45 to 65 percent pebbles (by weight); subangular blocky structure; hard, firm; moderately alkaline (pH 8.2); nonsaline (less than 3 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GC; estimated AASHTO classification—A-2

12 to 13 inches—indurated hardpan

13 inches—unweathered bedrock

**Range in depth to hardpan:** 8 to 14 inches

**Range in depth to bedrock:** 10 to 20 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Slow

**Available water capacity:** 2 inches

**Water supplying capacity:** 8 inches

**Runoff:** Rapid

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.10; T value—1; wind erodibility group—7

**Hazard of erosion:** By water—moderate; by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—high; to concrete—low

**Potential frost action:** Moderate

*Olac Soil*

**Position on landscape:** North- and east-facing back slopes of hills and mountains

**Parent material:** Kind—residuum, colluvium; source—volcanic rock

**Dominant present vegetation:** Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

**Rock fragments on surface:** Kind—gravel, cobbles, stones; percentage of surface covered—90

**Typical profile**

0 to 3 inches—very stony loam; 25 to 55 percent cobbles and stones and 45 to 65 percent pebbles (by weight); granular structure; slightly hard, very

friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2

3 to 10 inches—extremely gravelly clay loam; 10 to 20 percent cobbles and 65 to 80 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.2); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—GC; estimated AASHTO classification—A-2

10 inches—unweathered bedrock

**Range in depth to bedrock:** 8 to 14 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderate

**Available water capacity:** 1 inch

**Water supplying capacity:** 5 inches

**Runoff:** Very rapid

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.10; T value—1; wind erodibility group—8

**Hazard of erosion:** By water—moderate; by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—moderate; to concrete—low

**Potential frost action:** Moderate

*Contrasting Inclusions*

**Inclusion 1:** Position on landscape—south-facing back slopes of hills and mountains; contrasting feature—no layer of clay accumulation; distinctive present vegetation—shadscale, Bailey greasewood, Indian needlegrass, desert needlegrass

**Inclusion 2:** Position on landscape—ridges and back slopes of hills and mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

**Inclusion 3:** Position on landscape—narrow drainageways of hills and mountains; contrasting feature—bedrock at a depth of more than 40 inches; distinctive present vegetation—shadscale, Bailey greasewood, Indian needlegrass

**Inclusion 4:** Position on landscape—pockets on the leeward side of hills and mountains; contrasting features—deep, nongravelly; distinctive present vegetation—Indian needlegrass, fourwing saltbush, winterfat, Nevada daisy

**Major Uses**

Rangeland, wildlife habitat



**Potential Native Plant Community (Table 18)****Elements of Wildlife Habitat***Suitability of Theon soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Lapon soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Olac soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Ratings for Selected Uses***(Theon Soil)**Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, too and small stones

*(Lapon Soil)**Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, large stones

*(Olac Soil)**Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, large stones

**Interpretive Groups**

*Capability classification:* Theon soil—VIIIs, nonirrigated; Lapon soil—VIs, nonirrigated; Olac soil—VIIIs, nonirrigated

*Range site symbol:* Theon soil—027X017N, Lapon soil—027X020N, Olac soil—026X025N

**211—Theon-Rock outcrop-Old Camp association****Map Unit Setting***Position on landscape:* Hills, mountains*Elevation:* 5 000 to 6 000 feet*Climatic data (average annual):*

Precipitation—about 7 inches

Air temperature—about 50 degrees F

Frost-free season—about 110 days

**Composition**

*Theon very stony loam, 30 to 50 percent slopes (Lithic Haplargids - loamy-skeletal, mixed, mesic)—40 percent*

*Rock outcrop—30 percent*

*Old Camp very stony loam, 30 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—15 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Singatse very stony sandy loam (Lithic Torriorthents - loamy-skeletal, mixed (calcareous), mesic)—5 percent

*Inclusion 2:* Olac very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—5 percent

*Inclusion 3:* Rubble land—5 percent

*Theon Soil*

*Position on landscape:* Back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Desert needlegrass, littleleaf horsebrush, Indian ricegrass, shadscale

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—90

*Typical profile*

0 to 2 inches—very stony loam; 15 to 55 percent cobbles and stones and 26 to 55 percent pebbles (by weight), granular structure, slightly hard, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM-SC, GM-GC; estimated AASHTO classification—A-2, A-4

2 to 11 inches—very gravelly loam, very gravelly clay loam; 5 to 10 percent cobbles and stones and 50 to 75 percent pebbles (by weight), subangular blocky structure, slightly hard, friable, mildly alkaline (pH 7.6), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GC; estimated AASHTO classification—A-2

11 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1 inch

*Water supplying capacity:* 5 inches

*Runoff:* Very rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.05, T value—1, wind erodibility group—8

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Low

*Rock Outcrop*

*Position on landscape:* Occurs randomly as small peaks and ridges on hills and mountains

*Dominant present vegetation:* Barren

*Old Camp Soil*

*Position on landscape:* North-facing back slopes of hills and mountains

*Parent material:* Kind—colluvium; source—volcanic rock

**Dominant present vegetation.** Wyoming big sagebrush, green ephedra, desert needlegrass

**Rock fragments on surface:** Kind—gravel, cobbles, stones; percentage of surface covered—90

**Typical profile**

0 to 2 inches—very stony loam, 25 to 55 percent cobbles and stones and 35 to 45 percent pebbles (by weight); granular structure; soft, very friable; neutra (pH 6.8), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—GM, GM-GC, SM, SM-SC, estimated AASHTO classification—A-2, A-4

2 to 14 inches—very cobbly clay loam, extremely stony sandy clay loam, 35 to 50 percent cobbles and stones and 50 to 65 percent pebbles (by weight); subangular blocky structure; hard, firm; mildly alkaline (pH 7.6), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—GC; estimated AASHTO classification—A-2, A-6

14 inches—unweathered bedrock

**Range in depth to bedrock.** 10 to 20 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 1.5 inches

**Water supplying capacity:** 6 inches

**Runoff:** Very rapid

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.17; T value—1; wind erodibility group—B

**Hazard of erosion:** By water—severe, by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—high to concrete—low

**Potential frost action:** Low

**Contrasting Inclusions**

**Inclusion 1:** Position on landscape—very steep, south-facing back slopes, contrasting feature—no layer of clay accumulation; distinctive present vegetation—shadscale, Bailey greasewood, Indian ricegrass, desert needlegrass

**Inclusion 2:** Position on landscape—convex, north-facing back slopes of hills and mountains, contrasting feature—higher water supplying capacity; distinctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush squirreltail

**Inclusion 3:** Position on landscape—concave back slopes of hills and mountains, contrasting feature—more than 90 percent stones on the surface, distinctive present vegetation—barren

**Major Uses**

Range and, wildlife habitat

**Potential Native Plant Community (Table 19)**

**Elements of Wildlife Habitat**

**Suitability of Theon soil for named elements.**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Suitability of Old Camp soil for named elements.**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Ratings for Selected Uses**

**(Theon Soil)**

**Suitability and limitations for the following use—**

Range and seeding: Poor—too arid, droughty, large stones

**(Old Camp Soil)**

**Suitability and limitations for the following use—**

Range and seeding: Poor—large stones, droughty

**Interpretive Groups**

**Capability classification:** Theon soil—VI s, nonirrigated

Rock outcrop—VI ls, Old Camp soil—VI s, nonirrigated

**Range site symbol:** Theon soil—027X017N, Old Camp soil—026X022N

**212—Theon-Singatse association**

**Map Unit Setting**

**Position on landscape.** Hills, mountains

**Elevation:** 4,400 to 5,400 feet

**Climatic data (average annual).**

Precipitation—about 6 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

**Composition**

**Theon very gravelly loam, 30 to 75 percent slopes (Lithic Haplargids - loamy-skeletal, mixed, mesic)—55 percent**

**Singatse very stony sandy loam, 30 to 75 percent slopes (Lithic Tororthents - loamy-skeletal, mixed (calcareous), mesic)—35 percent**

**Contrasting inclusions as follows—**

**Inclusion 1:** Rock outcrop—6 percent

**Inclusion 2:** Cleaver very gravelly sandy loam 4 to 15 percent slopes (Typic Durargids - loamy, mixed, mesic, shallow)—4 percent

**Theon Soil**

**Position on landscape:** Back slopes and crests of hills and mountains

**Parent material:** Kind—residuum, colluvium; source—volcanic rock

**Dominant present vegetation:** Desert needlegrass, tte eaf horsebrush, indian ricegrass, shadscale  
**Rock fragments on surface:** Kind—gravel; percentage of surface covered—80

**Typical profile**

- 0 to 2 inches—very gravelly loam; 5 to 10 percent cobbles and 50 to 70 percent pebbles (by weight); granular structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, GM-GC; estimated AASHTO classification—A-1, A-2
- 2 to 11 inches—very gravelly clay loam; 5 to 15 percent cobbles and 50 to 70 percent pebbles (by weight); subangular blocky structure; slightly hard friable; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—GC; estimated AASHTO classification—A-2
- 11 inches or more—unweathered bedrock

**Range in depth to bedrock:** 8 to 14 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 1 inch

**Water supplying capacity:** 5 inches

**Runoff:** Very rapid

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.05; T value—1; wind erodibility group—8

**Hazard of erosion:** By water—moderate; by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—high; to concrete—low

**Potential frost action:** Low

**Singatse Soil**

**Position on landscape:** Unstable back slopes of hills and mountains

**Parent material:** Kind—colluvium; source—volcanic rock

**Dominant present vegetation:** Shadscale, Bailey greasewood, indian ricegrass, desert needlegrass

**Rock fragments on surface:** Kind—gravel, cobbles, stones; percentage of surface covered—90

**Typical profile**

- 0 to 1 inch—very stony sandy loam; 25 to 45 percent cobbles and stones and 45 to 65 percent pebbles (by weight); platy structure; soft, very friable; moderately alkaline (pH 8.2); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-1
- 1 to 6 inches—very gravelly loam; 0 to 10 percent cobbles and stones and 50 to 70 percent pebbles (by weight); massive; slightly hard, very friable, strongly alkaline (pH 8.8); nonsaline (less than 2

mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-1

6 inches—unweathered bedrock

**Range in depth to bedrock:** 4 to 10 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderate

**Available water capacity:** 0.5 inch

**Water supplying capacity:** 4 inches

**Runoff:** Very rapid

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.10; T value—1; wind erodibility group—8

**Hazard of erosion:** By water—severe; by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—high; to concrete—low

**Potential frost action:** Low

**Contrasting Inclusions**

**Inclusion 1:** Position on landscape—ridges and back slopes of hills and mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

**Inclusion 2:** Position on landscape—toe slopes and alluvial fans at the base of hills and mountains; contrasting feature—hardpan at a depth of 10 to 20 inches; distinctive present vegetation—shadscale greasewood, indian ricegrass

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 20)**

**Elements of Wildlife Habitat**

**Suitability of Theon soil for named elements.**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Suitability of Singatse soil for named elements**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Ratings for Selected Uses**

**(Theon Soil)**

**Suitability and limitations for the following use—**

Rangeland seeding: Poor—too and. droughty, small stones

**(Singatse Soil)**

**Suitability and limitations for the following use—**

Rangeland seeding: Poor—too and. droughty, large stones

### Interpretive Groups

*Capability classification:* Theon soil—VIs, nonirrigated;  
Singatse soil—VIs, nonirrigated

*Range site symbol:* Theon soil—027X017N; Singatse  
soil—027X027N

### 213—Theon-Old Camp association

#### Map Unit Setting

*Position on landscape:* Hills, mountains

*Elevation:* 5,000 to 5,800 feet

*Climatic data (average annual):*

Precipitation—about 7 inches

Air temperature—about 50 degrees F

Frost-free season—about 110 days

#### Composition

*Theon stony sandy loam, 15 to 50 percent slopes (Lithic  
Haplargids - loamy-skeletal, mixed, mesic)—55  
percent*

*Old Camp very stony loam, 15 to 50 percent slopes  
(Lithic Xerollic Haplargids - loamy-skeletal, mixed,  
mesic)—30 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Rock outcrop—10 percent

*Inclusion 2:* Veta very gravelly sandy loam, 2 to 8  
percent slopes (Xerollic Camborthids - loamy-  
skeletal, mixed mesic)—3 percent

*Inclusion 3:* Singatse very stony sandy loam, 15 to  
50 percent slopes (Lithic Tororthents - loamy-  
skeletal, mixed (calcareous), mesic)—2 percent

#### Theon Soil

*Position on landscape:* South- and west-facing back  
slopes and ridges of hills and mountains

*Parent material:* Kind—residuum, colluvium, source—  
volcanic rock

*Dominant present vegetation:* Desert needlegrass,  
tule-eat horsebrush, Indian ricegrass, shadscale

*Rock fragments on surface:* Kind—gravel, cobbles,  
stones; percentage of surface covered—80

*Typical profile*

0 to 2 inches—stony sandy loam; 10 to 25 percent  
cobbles and stones and 45 to 55 percent pebbles  
(by weight); granular structure; slightly hard, very  
friable; neutral (pH 7.0); nonsaline (less than 2  
mmhos/cm); nonsodic (SAR of less than 3);  
estimated Unified classification—GM-GC;  
estimated AASHTO classification—A-2

2 to 10 inches—very gravelly loam, very gravelly  
clay loam; 5 to 10 percent cobbles and stones  
and 50 to 75 percent pebbles (by weight);  
subangular blocky structure; slightly hard, friable,  
mildly alkaline (pH 7.6); nonsaline (less than 2  
mmhos/cm); nonsodic (SAR of less than 10);

estimated Unified classification—GC; estimated  
AASHTO classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60  
inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1 inch

*Water supplying capacity:* 5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—  
1; wind erodibility group—8

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Low

#### Old Camp Soil

*Position on landscape:* North-facing back slopes of hills  
and mountains

*Parent material:* Kind—colluvium, source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush,  
green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles,  
stones; percentage of surface covered—80

*Typical profile*

0 to 2 inches—very stony loam, 25 to 55 percent  
cobbles and stones and 35 to 45 percent pebbles  
(by weight); granular structure; slightly hard, very  
friable; neutral (pH 7.0); nonsaline (less than 2  
mmhos/cm); nonsodic (SAR of less than 3);  
estimated Unified classification—GM-GM-GC,  
SM-SM-SC; estimated AASHTO classification—  
A-2-A-4

2 to 14 inches—very cobbly clay loam, extremely  
stony sandy clay loam, very stony clay loam; 35  
to 50 percent cobbles and stones and 50 to 65  
percent pebbles (by weight); subangular blocky  
structure; hard, firm; moderately alkaline (pH 8.2);  
nonsaline (less than 2 mmhos/cm); nonsodic  
(SAR of less than 8); estimated Unified  
classification—GC; estimated AASHTO  
classification—A-2, A-6

14 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60  
inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 5 inches

*Runoff:* Rapid

*Hydrologic group:* D

**Erosion factors (upper layer):** K value—0.17; T value—1; wind erodibility group—8  
**Hazard of erosion:** By water—severe; by wind—slight  
**Shrink-swell potential:** Low  
**Corrosivity:** To steel—high, to concrete—low  
**Potential frost action:** Moderate

#### Contrasting Inclusions

- Inclusion 1:** Position on landscape—ridges and back slopes of hills and mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren
- Inclusion 2:** Position on landscape—drainageways of hills and mountains; contrasting features—slopes of less than 15 percent; bedrock at a depth of more than 60 inches; distinctive present vegetation—big sagebrush, rabbitbrush, spiny hopsage
- Inclusion 3:** Position on landscape—erosional back slopes of hills and mountains; contrasting feature—no layer of clay accumulation; distinctive present vegetation—shadscale, Bailey greasewood, Indian ricegrass, desert needlegrass

#### Major Uses

Rangeland, wildlife habitat

#### Potential Native Plant Community (Table 21)

#### Elements of Wildlife Habitat

##### *Suitability of Theon soil for named elements*

- Wild herbaceous plants (nonirrigated)—poor
- Shrubs (nonirrigated)—poor

##### *Suitability of Old Camp soil for named elements*

- Wild herbaceous plants (nonirrigated)—poor
- Shrubs (nonirrigated)—poor

#### Ratings for Selected Uses

##### *(Theon Soil)*

##### *Suitability and limitations for the following use—*

- Rangeland seeding: Poor—too arid, droughty, large stones

##### *(Old Camp Soil)*

##### *Suitability and limitations for the following use—*

- Rangeland seeding: Poor—droughty, large stones

#### Interpretive Groups

**Capability classification:** Theon soil—VIs, nonirrigated;  
 Old Camp soil—VIs, nonirrigated

**Range site symbol:** Theon soil—027X017N, Old Camp soil—026X022N

#### 220—Ister-Devada association

#### Map Unit Setting

**Position on landscape:** Hills, mountains

**Elevation:** 5,600 to 7,000 feet

**Climatic data (average annual)**

Precipitation—about 11 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

#### Composition

**Ister very stony sandy loam, 30 to 50 percent slopes** (Aridic Argixerolls - loamy-skeletal, mixed, mesic)—45 percent

**Devada very stony loam, 8 to 30 percent slopes** (Lithic Argixerolls - clayey, montmorillonitic, mesic)—40 percent

##### *Contrasting inclusions as follows—*

**Inclusion 1:** Old Camp very stony loam, 30 to 50 percent slopes (Lithic Xeroch Haplargids - loamy-skeletal, mixed, mesic)—5 percent

**Inclusion 2:** Tristan very stony loam, 30 to 50 percent slopes (Aridic Argixerolls - loamy-skeletal, mixed, mesic)—5 percent

**Inclusion 3:** Rock outcrop—5 percent

#### *Ister Soil*

**Position on landscape:** Back slopes of hills and mountains

**Parent material:** Kind—residuum, colluvium; source—volcanic rock

**Dominant present vegetation:** Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

**Rock fragments on surface:** Kind—grave, cobbles, stones; percentage of surface covered—80

##### *Typical profile*

0 to 17 inches—very stony sandy loam, 20 to 30 percent cobbles and stones and 25 to 45 percent pebbles (by weight); granular structure, slightly hard, very friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM, GM; estimated AASHTO classification—A-2, A-4

17 to 38 inches—very stony sandy clay loam, very stony clay loam; 35 to 45 percent cobbles and stones and 20 to 45 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, SC; estimated AASHTO classification—A-2, A-6, A-7

38 inches—unweathered bedrock

**Range in depth to bedrock:** 25 to 40 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 3 inches

**Water supplying capacity:** 9 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.10; T value—2; wind erodibility group—B

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### *Devada Soil*

*Position on landscape:* Convex back slopes and ridges of hills and mountains

*Parent material:* Kind—residual; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—cobbles, stones; percentage of surface covered—80

*Typical profile:*

0 to 4 inches—very stony loam; 25 to 60 percent cobbles and stones and 0 to 10 percent pebbles (by weight); granular structure; slightly hard, very friable, slightly acid (pH 6.4); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 2); estimated Unified classification—SC, CL, SM-SC, CL-M; estimated AASHTO classification—A-4 A-6

4 to 13 inches—gravelly clay clay; 0 to 5 percent cobbles and stones and 0 to 45 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CH, GC; estimated AASHTO classification—A-7

13 inches—unweathered bedrock

*Range in depth to bedrock:* 12 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—1; wind erodibility group—B

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

#### *Contrasting Inclusions*

*inclusion 1:* Position on landscape—convex, south-facing back slopes of hills and mountains; contrasting feature—lower water supplying capacity,

distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*inclusion 2:* Position on landscape—concave, north-facing back slopes of hills and mountains; contrasting feature—receives additional moisture from runoff; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*inclusion 3:* Position on landscape—ridges and back slopes of hills and mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 22)**

#### **Elements of Wildlife Habitat**

*Suitability of Ister soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Devada soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

*(Ister Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Poor—large stones

*(Devada Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, rooting depth

#### **Interpretive Groups**

*Capability classification:* Ister soil—VIIIs, nonirrigated; Devada soil—VIIIs, nonirrigated

*Range site symbol:* Ister soil—026X010N, Devada soil—026X023N

#### **221—Ister-Old Camp-Rock outcrop association**

#### **Map Unit Setting**

*Position on landscape:* Hills, mountains

*Elevation:* 6,300 to 6,700 feet

*Climatic data (average annual)*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 100 days

**Composition**

*Arctic very stony sandy loam, 30 to 50 percent slopes*  
(*Arctic Argixerolls - loamy skeletal, mixed, mesic*)—40 percent

*Old Camp very stony loam, 15 to 50 percent slopes*  
(*Lithic Xerochic Haplargids - loamy-skeletal, mixed, mesic*)—25 percent

*Rock outcrop*—20 percent

*Contrasting inclusions as follows—*

*Inclusion 1:* Rubble land—8 percent

*Inclusion 2:* Olac very stony loam, 30 to 50 percent slopes (*Lithic Xerochic Haplargids - loamy-skeletal, mixed, mesic*)—7 percent

**Arctic Soil**

*Position on landscape:* North- and east-facing back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—75

*Typical profile:*

0 to 17 inches—very stony sandy loam, 20 to 30 percent cobbles and stones and 25 to 45 percent pebbles (by weight); granular structure, slightly hard, very friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SM, GM; estimated AASHTO classification—A-2, A-4

17 to 38 inches—very stony sandy clay loam, very stony clay loam; 35 to 45 percent cobbles and stones and 20 to 45 percent pebbles (by weight), subangular blocky structure; hard, firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GC, SC; estimated AASHTO classification—A-2, A-6, A-7

38 inches—unweathered bedrock

*Range in depth to bedrock:* 25 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 3 inches

*Water supplying capacity:* 9 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.10; T value—2; wind erodibility group—8

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

**Old Camp Soil**

*Position on landscape:* South- and west-facing back slopes of hills and mountains

*Parent material:* Kind—colluvium; source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—80

*Typical profile:*

0 to 2 inches—very stony loam, 25 to 55 percent cobbles and stones and 35 to 45 percent pebbles (by weight); granular structure, slightly hard, very friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—GM, GM-GC, SM, SM-SC; estimated AASHTO classification—A-2, A-4

2 to 14 inches—very cobbly clay loam, extremely stony sandy clay loam; 35 to 50 percent cobbles and stones and 50 to 65 percent pebbles (by weight); subangular blocky structure, hard, firm; moderately alkaline (pH 8.2), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 8); estimated Unified classification—GC; estimated AASHTO classification—A-2, A-6

14 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

**Rock Outcrop**

*Position on landscape:* Ridges and back slopes of mountains and hills

*Dominant present vegetation:* Barren

**Contrasting Inclusions**

*Inclusion 1:* Position on landscape—plane to concave back slopes of hills and mountains; contrasting feature—more than 90 percent stones on the surface; distinctive present vegetation—barren

*Inclusion 2:* Position on landscape—convex back slopes and ridges of hills and mountains; contrasting feature—very low water supplying capacity



distinctive present vegetation—low sagebrush,  
Thurber needlegrass, bottlebrush squirreltail

### Major Uses

Rangeland, wildlife habitat

### Potential Native Plant Community (Table 23)

#### Elements of Wildlife Habitat

*Suitability of Ister soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Old Camp soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

### Ratings for Selected Uses

*(Ister Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Poor—large stones

*(Old Camp Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, droughty

### Interpretive Groups

*Capability classification.* Ister soil—VIIIs, nonirrigated;

Old Camp soil—VIIs, nonirrigated; Rock butcrop—  
VIIIs

*Range site symbol:* Ister soil—026X010N Old Camp  
soil—026X022N

**230—Sagoupe sandy loam, 0 to 2 percent slopes,  
occasionally flooded**

### Map Unit Setting

*Position on landscape:* Flood plains

*Elevation:* 4,000 to 4,100 feet

*Climatic data (average annual)*

Precipitation—about 6 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

### Composition

*Sagoupe sandy loam, 0 to 2 percent slopes,  
occasionally flooded (Aquic Xerofluents - sandy,  
mixed, mesic)*

*Contrasting inclusions as follows—*

*Inclusion 1.* Aquic Xerofluents (Aquic  
Xerofluents - fine-loamy, mixed, mesic)—8  
percent

*Inclusion 2:* Aquic Xerofluents (Aquic  
Xerofluents - sandy-skeletal, mixed, mesic)—7  
percent

### Sagoupe Soil

*Position on landscape:* Flood plains

*Parent material:* Kind—alluvium, source—various kinds  
of rock

*Dominant present vegetation.* Tufted hairgrass, sedge  
rush, Nevada bluegrass

*Typical profile:*

0 to 22 inches—sandy loam; 0 to 5 percent gravel  
(by weight); massive; soft, very friable; moderately  
alkaline (pH 8.2), nonsaline (less than 4  
mmhos/cm); slightly sodic (SAR of less than 25),  
estimated Unified classification—SM, estimated  
AASHTO classification—A-2

22 to 60 inches or more—sand, loamy sand; 5 to 20  
percent gravel (by weight); single grain, loose,  
moderately alkaline (pH 8.2), nonsaline (less than  
2 mmhos/cm), nonsodic (SAR of less than 13),  
estimated Unified classification—SM, SP-SM,  
estimated AASHTO classification—A-1, A-2, A-3

*Depth to seasonal high water table:* 18 to 40 inches

*Hazard of flooding:* Frequency—occasional; duration—  
long; months—April to June

*Permeability:* Moderately rapid

*Available water capacity:* 5.5 inches

*Water supplying capacity:* 14 inches

*Runoff:* Very slow

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.24 T value—  
5; wind erodibility group—3

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* High

### Contrasting Inclusions

*Inclusion 1:* Position on landscape—flood plains,  
contrasting feature—loam and sandy clay loam  
throughout the profile; distinctive present  
vegetation—tufted hairgrass, sedge, rush, Nevada  
bluegrass

*Inclusion 2:* Position on landscape—flood plains,  
contrasting feature—gravelly loamy sand and very  
gravelly sand throughout the profile; distinctive  
present vegetation—tufted hairgrass, sedge, rush,  
Nevada bluegrass

### Major Uses

Rangeland, wildlife habitat

### Potential Native Plant Community (Table 24)

#### Elements of Wildlife Habitat

*Suitability for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

Wetland plants—poor

Shallow water areas—poor

### Ratings for Selected Uses

*Suitability and limitation for the following use—*

Rangeland seeding: Fair—excess salt

### Interpretive Groups

*Capability classification:* VIIw, nonirrigated

*Range site symbol:* 027X004N

**231—Sagoupe sandy loam, 0 to 2 percent slopes, rarely flooded**

### Map Unit Setting

*Position on landscape:* Flood plains

*Elevation:* 4,000 to 4,100 feet

*Climatic data (average annual):*

Precipitation—about 6 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

### Composition

*Sagoupe sandy loam, 0 to 2 percent slopes, rarely flooded (Aquic Xerofluvents - sandy, mixed, mesic)*

*Contrasting inclusions as follows—*

*Inclusion 1:* Aquic Xerofluvents (Aquic Xerofluvents - sandy-skeletal, mixed, mesic)—10 percent

*Inclusion 2:* Aquic Xerofluvents (Aquic Xerofluvents - fine-loamy, mixed, mesic)—5 percent

### Sagoupe Soil

*Position on landscape:* Intermediate stream terraces

*Parent material:* Kind—alluvium; source—various kinds of rock

*Dominant present vegetation:* Basin wildrye, creeping wildrye, western wheatgrass

*Typical profile:*

0 to 21 inches—sandy loam; massive; soft, very friable; moderately alkaline (pH 8.0); nonsaline (less than 2 mmhos/cm); slightly sodic (SAR of less than 25); estimated Unified classification—SM, ML, estimated AASHTO classification—A-4

21 to 60 inches or more—stratified loamy coarse sand to silt loam, massive, soft, very friable; strongly alkaline (pH 8.6), nonsaline (less than 2 mmhos); nonsodic (SAR of less than 13); estimated Unified classification—SM, estimated AASHTO classification—A-2, A-4

*Depth to seasonal high water table:* 36 to 60 inches

*Hazard of flooding:* Rare

*Permeability:* Moderately rapid

*Available water capacity:* 5.5 inches

*Water supplying capacity:* 7 inches

*Runoff:* Slow

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.24 T value—5, wind erodibility group—3

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

### Contrasting Inclusions

*Inclusion 1:* Position on landscape—flood plains, contrasting feature—gravelly loamy sand and very gravelly sand throughout the profile; distinctive present vegetation—basin wildrye, creeping wildrye, western wheatgrass

*Inclusion 2:* Position on landscape—flood plains, contrasting feature—sandy clay loam and silt loam throughout the profile; distinctive present vegetation—basin wildrye, creeping wildrye, western wheatgrass

### Major Uses

Irrigated cropland, rangeland, wildlife habitat

### Potential Native Plant Community (Table 25)

### Elements of Wildlife Habitat

*Suitability for named elements*

Grain and seed crops (irrigated)—good

Domestic grasses and legumes (irrigated)—good

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

Wetland plants—fair

Shallow water areas—fair

### Ratings for Selected Uses

*Suitability and limitation for the following use—*

Rangeland seeding: Fair—too arid

### Interpretive Groups

*Capability classification:* IIIw, irrigated and VIw, nonirrigated

*Range site symbol:* 027X002N

### 250—Chalco-Haar association

### Map Unit Setting

*Position on landscape:* Hills, mountains

*Elevation:* 5,000 to 6,000 feet

*Climatic data (average annual):*

Precipitation—about 8 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

## Composition

*Chalco very cobbly loam, 4 to 15 percent slopes (Xerollic Haplargids clayey, montmorillonitic, mesic, shallow)*—60 percent

*Haar loam, 15 to 50 percent slopes (Xeric Torriorthents - loamy, mixed, nonacid, mesic, shallow)*—25 percent

*Contrasting inclusions as follows:*

*Inclusion 1:* Aquic Haploxerolls (Aquic Haploxerolls - fine-loamy, mixed, mesic)—8 percent

*Inclusion 2:* Rock outcrop—5 percent

*Inclusion 3:* Smallcone very gravelly coarse sandy loam, 15 to 50 percent slopes (Lithic Xeric Torriorthents - loamy-skeletal, mixed, nonacid, mesic, shallow)—2 percent

## Chalco Soil

*Position on landscape:* Hills, mountains

*Parent material:* Kind—residuum, colluvium; source—loft

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, percentage of surface covered—90

*Typical profile*

0 to 5 inches—very cobbly loam; 30 to 45 percent cobbles and stones and 30 to 40 percent pebbles (by weight); platy structure; slightly hard, very friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, SM-SC; estimated AASHTO classification—A-4, A-6

5 to 14 inches—clay silty clay, 0 to 5 percent cobbles and stones and 0 to 25 percent pebbles (by weight); prismatic structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—CH; estimated AASHTO classification—A-7

14 inches—weathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Very slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—7

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

## Haar Soil

*Position on landscape:* Erosional back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—diatomaceous earth, interbedded sedimentary rock

*Dominant present vegetation:* Singleleaf pinyon, Utah juniper

*Rock fragments on surface:* Kind—cobbles; percentage of surface covered—less than 5

*Typical profile*

0 to 4 inches—loam; 0 to 15 percent cobbles and 0 to 25 percent pebbles (by weight); platy structure slightly hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—CL-M, estimated AASHTO classification—A-4

4 inches—weathered bedrock

*Range in depth to bedrock:* 4 to 10 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 0.5 inch

*Water supplying capacity:* 5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.43; T value—1; wind erodibility group—5

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

## Contrasting Inclusions

*Inclusion 1:* Position on landscape—drainageways of hills and mountains; contrasting features—water table at a depth of 40 to 60 inches, thick dark-colored upper layer, higher water supplying capacity; distinctive present vegetation—basin big sagebrush basin wildrye

*Inclusion 2:* Position on landscape—erosional back slopes of hills and mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

*Inclusion 3:* Position on landscape—back slopes of hills and mountains; contrasting feature—reaction less than 6.0 throughout the profile; distinctive present vegetation—ponderosa pine

## Major Uses

Rangeland, wildlife habitat

## Potential Native Plant Community (Table 26)

## Woodland

(Haar Soil)

*Site index for common trees:* Singleleaf pinyon—10, Utah juniper—10

*Most important native understory plants:* Wyoming big sagebrush, antelope bitterbrush, Nevada ephedra, Thurber needlegrass

### Elements of Wildlife Habitat

*Suitability of Chaico soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

*Suitability of Haar soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor  
Coniferous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

### Ratings for Selected Uses

*(Chaico Soil)*

*Suitability and limitations for the following use—*

Range and seedling: Poor—large stones, droughty, rooting depth

*(Haar Soil)*

*Suitability and limitations for the following use—*

Range and seedling: Poor—droughty, depth to rock, erodes easily

### Interpretive Groups

*Capability classification:* Chaico soil—Vt1s, nonirrigated, Haar soil—Vt1s, nonirrigated

*Range site symbol:* Chaico soil—026X023N

*Woodland suitability group:* Haar soil—1r

## 260—Lapon-Fulstone-Olac association

### Map Unit Setting

*Position on landscape:* Fans, pediments, hills

*Elevation:* 4,600 to 5,000 feet

*Climatic data (average annual):*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

### Composition

*Lapon very stony loam, 4 to 15 percent slopes (Xerollic Durargids - loamy-skeletal, mixed, mesic, shallow)—45 percent*

*Fulstone cobbly loam, 2 to 8 percent slopes (Abruptic Xerollic Durargids - clayey, montmorillonitic, mesic, shallow)—25 percent*

*Olac very stony loam, 8 to 30 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—15 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—8 percent

*Inclusion 2:* Veta very gravelly sandy loam (Xerollic Camborthids - loamy-skeletal, mixed, mesic)—5 percent

*Inclusion 3:* Rock outcrop—2 percent

### Lapon Soil

*Position on landscape:* Hills, pediments

*Parent material:* Kind—residuum colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, pine bluegrass, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—75

*Typical profile*

0 to 2 inches—very stony loam, 15 to 40 percent cobbles and stones and 50 to 65 percent pebbles (by weight), platy structure; soft, very friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM-GM-GC, estimated AASHTO classification—A-2

2 to 10 inches—very gravelly clay loam, 10 to 25 percent cobbles and stones and 55 to 65 percent pebbles (by weight); subangular blocky structure; hard, friable, mildly alkaline (pH 7.6), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-2

10 to 20 inches—indurated hardpan

20 inches—unweathered bedrock

*Range in depth to hardpan:* 8 to 14 inches

*Range in depth to bedrock:* 10 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 6 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—7

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

### Fulstone Soil

*Position on landscape:* Alluvial fans

*Parent material:* Kind—alluvium; source—volcanic rock, influenced by volcanic ash

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush, squirrel-tail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile*

0 to 5 inches—cobbly loam; 15 to 30 percent cobbles and 25 to 35 percent pebbles (by weight); subangular blocky structure; slightly hard, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM-GC, SM-SC; estimated AASHTO classification—A-4

5 to 18 inches—clay 0 to 5 percent cobbles and 0 to 10 percent pebbles (by weight); prismatic structure; very hard, firm; mildly alkaline (pH 7.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

18 to 55 inches or more—indurated hardpan

*Range in depth to hardpan:* 14 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Slow

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.28; T value—1; wind erodibility group—7

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

#### *Olac Soil*

*Position on landscape:* Hills

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—80

*Typical profile:*

0 to 3 inches—very stony loam; 25 to 55 percent cobbles and stones and 45 to 65 percent pebbles (by weight); granular structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2

3 to 10 inches—extremely gravelly clay loam, extremely gravelly loam; 10 to 20 percent cobbles and stones and 65 to 80 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GC; estimated AASHTO classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 0.5 inch

*Water supplying capacity:* 5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—plane to concave north-facing back slopes of hills; contrasting feature—contains lime in the lower part of the profile; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 2:* Position on landscape—drainageways; contrasting features—bedrock at a depth of more than 60 inches, rarely flooded; distinctive present vegetation—basin big sagebrush, antelope bitterbrush, basin wildrye

*Inclusion 3:* Position on landscape—ridges and back slopes of hills; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

#### *Major Uses*

Rangeland, wildlife habitat

#### *Potential Native Plant Community (Table 27)*

#### *Elements of Wildlife Habitat*

*Suitability of Lapon soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Fulstone soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Olac soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### *Ratings for Selected Uses*

*(Lapon Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, large stones

*(Fulstone Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—rooting depth small stones, droughty

*(Olac Soil)*

*Suitability and limitations for the following use—*

Range and seeding: Poor—large stones, droughty

**Interpretive Groups**

*Capability classification:* Lapon soil—Vlls, nonirrigated; Fulstone soil—Vlls, nonirrigated, Olac soil—Vlls, nonirrigated

*Range site symbol:* Lapon soil—027X020N; Fulstone soil—026X025N; Olac soil—026X025N

**275—Chilt coarse sand, 8 to 30 percent slopes****Map Unit Setting**

*Position on landscape:* Hills

*Elevation:* 5,000 to 5,500 feet

*Climatic data (average annual)*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

**Composition**

*Chilt coarse sand, 8 to 30 percent slopes (Xerollic Haplargids - loamy, mixed, mesic, shallow)*

*Contrasting inclusions as follows—*

*Inclusion 1:* Xeric Torripsamments (Xeric Torripsamments - mixed, mesic)—10 percent

*Inclusion 2:* Ackley gravelly sandy loam (Xerollic Haplargids - fine-loamy, mixed, mesic)—3 percent

*Inclusion 3:* Veta very gravelly sandy loam (Xerollic Camborthids - loamy-skeletal, mixed, mesic)—2 percent

*Chilt Soil*

*Position on landscape:* Tops and back slopes of hills

*Parent material:* Kind—residuum, colluvium; source—granitic rock

*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—50

*Typical profile*

0 to 5 inches—coarse sand; 0 to 25 percent pebbles (by weight); single grain; loose, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SP, SM, SP-SM; estimated AASHTO classification—A-1

5 to 14 inches—gravelly sandy clay loam; 25 to 50 percent fine pebbles (by weight); subangular blocky structure; hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC; estimated AASHTO classification—A-2

14 inches—weathered bedrock

*Range in depth to bedrock:* 6 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 0.5 inch

*Water supplying capacity:* 5.5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.15; T value—1; wind erodibility group—4

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

*Contrasting Inclusions*

*Inclusion 1:* Position on landscape—concave back slopes of hills; contrasting feature—bedrock at a depth of more than 40 inches; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 2:* Position on landscape—alluvial fans; contrasting feature—bedrock at a depth of more than 60 inches; distinctive present vegetation—Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass

*Inclusion 3:* Position on landscape—drainageways; contrasting features—bedrock at a depth of more than 60 inches; rare periods of flooding; distinctive present vegetation—Wyoming big sagebrush, spiny hopsage, Indian ricegrass

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 28)****Elements of Wildlife Habitat**

*Suitability for named elements*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Ratings for Selected Uses**

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—too sandy, droughty

**Interpretive Groups**

*Capability classification:* Vlls, nonirrigated

*Range site symbol:* 026X011N

**280—Perazzo very gravelly sandy loam, 2 to 4 percent slopes**

### Map Unit Setting

*Position on landscape:* Toe slopes of alluvial fans

*Elevation:* 4,200 to 4,400 feet

*Climatic data (average annual):*

Precipitation—about 7 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

### Composition

*Perazzo very gravelly sandy loam, 2 to 4 percent slopes*  
(Typic Haplargids - loamy-skeletal, mixed, mesic)

*Contrasting inclusion as follows—*

*Inclusion 1:* Veta very gravelly sandy loam (Xerollic Camborthids - loamy-skeletal mixed, mesic)—5 percent

#### *Perazzo Soil*

*Position on landscape:* Toe slopes of alluvial fans

*Parent material:* Kind—alluvium; source—various kinds of rock

*Dominant present vegetation:* Shadscale, Bailey greasewood, Indian ricegrass

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—60

*Typical profile*

0 to 4 inches—very gravelly sandy loam; 0 to 10 percent cobbles and 50 to 65 percent pebbles (by weight); platy structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-1

4 to 13 inches—very gravelly sandy clay loam, very gravelly clay loam, 0 to 5 percent cobbles and stones and 50 to 65 percent pebbles (by weight); subangular blocky structure; slightly hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2

13 to 21 inches—extremely gravelly loam, extremely gravelly sandy loam; 0 to 5 percent cobbles and stones and 75 to 85 percent pebbles (by weight); massive; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GM, GP-GM; estimated AASHTO classification—A-1

21 to 60 inches or more—extremely gravelly sand, extremely gravelly loamy sand; 0 to 5 percent cobbles and stones and 75 to 85 percent pebbles (by weight); massive; soft, very friable; moderately alkaline (pH 8.2); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GP, GP-GM; estimated AASHTO classification—A-1

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 3.5 inches

*Water supplying capacity:* 7 inches

*Runoff:* Slow

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.05, T value—3; wind erodibility group—5

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink swell potential:* Low

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Low

#### *Contrasting Inclusion*

*Inclusion 1:* Position on landscape—inset fans, drainageways, contrasting feature—no layer of clay accumulation, distinctive present vegetation—Wyoming big sagebrush, spiny hopsage, Indian ricegrass

### Major Uses

Rangeland, wildlife habitat, homesites, irrigated cropland

### Potential Native Plant Community (Table 29)

### Elements of Wildlife Habitat

*Suitability for named elements:*

Grain and seed crops (irrigated)—poor

Domestic grasses and legumes (irrigated)—poor

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

Wetland plants—very poor

Shallow water areas—very poor

### Ratings for Selected Uses

*Suitability and limitations for the following uses—*

Rangeland seeding: Poor—too arid, small stones

Shallow excavations: Severe—cutbanks cave

Local roads and streets: Slight

### Interpretive Groups

*Capability classification:* IVs, irrigated, and VI s, nonirrigated

*Range site symbol:* 027X018N

**281—Perazzo very stony sandy loam, 4 to 15 percent slopes**

### Map Unit Setting

*Position on landscape:* Alluvial fans

*Elevation:* 4,100 to 4,400 feet

*Climatic data (average annual):*



Precipitation—about 7 inches  
 Air temperature—about 50 degrees F  
 Frost free season—about 120 days

### Composition

*Perazzo very stony sandy loam, 4 to 15 percent slopes*  
*(Typic Haplargids - loamy-skeletal, mixed, mesic)*

*Contrasting inclusion as follows—*

*Inclusion 1* Veta very gravelly sandy loam (Xerollic Camborthids - loamy-skeletal, mixed, mesic)—5 percent

### Perazzo Soil

*Position on landscape:* Alluvial fans

*Parent material:* Kind—alluvium, source—various kinds of rock

*Dominant present vegetation:* Shadscale, Bailey greasewood, Indian ricegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—85

*Typical profile*

0 to 2 inches—very stony sandy loam, 20 to 30 percent cobbles and stones and 50 to 65 percent pebbles (by weight), platy structure, soft, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—GM, estimated AASHTO classification—A-1

2 to 13 inches—very gravelly sandy clay loam, very gravelly clay loam; 0 to 5 percent cobbles and stones and 50 to 65 percent pebbles (by weight), subangular blocky structure, slightly hard, friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13); estimated Unified classification—GC, estimated AASHTO classification—A-2

13 to 34 inches—extremely gravelly loam, extremely gravelly sandy loam; 0 to 5 percent cobbles and stones and 75 to 85 percent pebbles (by weight), massive, soft, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13); estimated Unified classification—GM, GP-GM; estimated AASHTO classification—A-1

34 to 60 inches or more—extremely gravelly sand, extremely gravelly loamy sand; 0 to 5 percent cobbles and stones and 75 to 85 percent pebbles (by weight); massive; soft, very friable, moderately alkaline (pH 8.2), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13); estimated Unified classification—GP, GP-GM; estimated AASHTO classification—A-1

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 3.5 inches

*Water supplying capacity:* 7 inches

*Runoff:* Medium

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.05, T value—3; wind erodibility group—B

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Low

### Contrasting Inclusion

*Inclusion 1.* Position on landscape—inset fans, drainageways; contrasting feature—no layer of clay accumulation; distinctive present vegetation—Wyoming big sagebrush, spiny hopsage, Indian ricegrass

### Major Uses

*Current uses:* Range and, wildlife habitat

*Potential foreseeable use:* Homesites

### Potential Native Plant Community (table 30)

### Elements of Wildlife Habitat

*Suitability for named elements*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

### Ratings for Selected Uses

*Suitability and limitations for the following uses—*

Rangeland seeding: Poor—large stones, too and small stones

Shallow excavations: Severe—cutbanks cave

Local roads and streets: Moderate—slope

### Interpretive Groups

*Capability classification:* VIIc, nonirrigated

*Range site symbol:* 027X018N

### 290—Springmeyer Variant loam, 0 to 2 percent slopes

### Map Unit Setting

*Position on landscape:* Intermontane valley fans

*Elevation:* 5,600 to 5,800 feet

*Climatic data (average annual)*

Precipitation—about 11 inches

Air temperature—about 49 degrees F

Frost free season—about 100 days

### Composition

*Springmeyer Variant loam, 0 to 2 percent slopes (Pachic Argixerolls - fine-loamy mixed, mesic)*

*Contrasting inclusions as follows—*

*Inclusion 1:* Xerollic Haplargids (Xerollic Haplargids - clayey, montmorillonitic, mesic)—6 percent

*Inclusion 2:* Aquic Haploxerolls (Aquic Haploxerolls - fine-loamy, mixed, mesic)—5 percent

*Inclusion 3:* Aquic Torrnorthents (Aquic Torrnorthents - loamy-skeletal, mixed, mesic)—4 percent

#### *Springmeyer Variant Soil*

*Position on landscape:* Intermontane valley fans

*Parent material:* Kind—alluvium; source—volcanic rock

*Dominant present vegetation:* Basin wildrye, basin big sagebrush, Nevada bluegrass

#### *Typical profile*

0 to 7 inches—loam, platy structure; 0 to 10 percent pebbles (by weight), soft, very friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—CL-ML, estimated AASHTO classification—A-4

7 to 47 inches—clay loam, silty clay loam, silt loam; 0 to 10 percent pebbles (by weight); prismatic structure; hard, friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—CL, estimated AASHTO classification—A-6

47 to 60 inches or more—loam, silt loam; 0 to 15 percent pebbles (by weight), massive; hard, friable, moderately alkaline (pH 8.4), nonsaline (less than 4 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CL-ML, estimated AASHTO classification—A-4

*Depth to seasonal high water table:* 54 to 66 inches

*Hazard of flooding:* Rare

*Permeability:* Moderately slow

*Available water capacity:* 11 inches

*Water supplying capacity:* 11 inches

*Runoff:* Very slow

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.32; T value—5; wind erodibility group—5

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—high to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—toe slopes of alluvial fans, contrasting feature—clay between depths of 4 and 20 inches, distinctive present vegetation—low sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 2:* Position on landscape—lowest part of basin without surface drainage; contrasting features—slopes of less than 1 percent, moderate

salinity; distinctive present vegetation—rubber rabbitbrush, saltgrass, basin big sagebrush

*Inclusion 3:* Position on landscape—drainageways contrasting feature—no layer of clay accumulation, distinctive present vegetation—sedges, rushes, rubber rabbitbrush

#### **Major Uses**

Homesites, rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 31)**

#### **Elements of Wildlife Habitat**

##### *Suitability for named elements:*

Wild herbaceous plants (nonirrigated)—good

Shrubs (nonirrigated)—good

#### **Ratings for Selected Uses**

##### *Suitability and limitations for the following uses—*

Rangeland seeding: Good

Shallow excavations: Moderate—wetness

Local roads and streets: Severe—low strength

#### **Interpretive Groups**

*Capability classification:* Vlc, nonirrigated

*Range site symbol:* 026X030N

### **313—Risley-Rubble land-Devada association**

#### **Map Unit Setting**

*Position on landscape:* Foothills

*Elevation:* 5,200 to 6,200 feet

*Climatic data (average annual):*

Precipitation—about 10 inches

Air temperature—about 49 degrees F

Frost-free season—about 110 days

#### **Composition**

*Risley extremely stony loam, 15 to 30 percent slopes* (Xerollic Haplargids - fine, montmorillonitic, mesic)—35 percent

*Rubble land—35 percent*

*Devada extremely cobbly loam, 8 to 15 percent slopes* (Lithic Argixerolls - clayey, montmorillonitic, mesic)—20 percent

##### *Contrasting inclusions as follows—*

*Inclusion 1:* Rock outcrop—5 percent

*Inclusion 2:* Lithic Xerollic Haplargids, 30 to 50 percent slopes (Lithic Xerollic Haplargids - clayey-skeletal, montmorillonitic, mesic)—3 percent

*Inclusion 3:* Old Camp extremely stony loam, 30 to 50 percent slopes (Lithic Xerollic

Haplargids: loamy-skeletal, mixed, mesic—2 percent

#### *Risley Soil*

*Position on landscape:* Back slopes of foothills

*Parent material:* Kind—residuum, colluvium; source—basalt

*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—90

#### *Typical profile*

0 to 6 inches—extremely stony loam; 25 to 40 percent cobbles and stones and 15 to 30 percent pebbles (by weight), granular structure; slightly hard, friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, SM-SC, CL-ML; estimated AASHTO classification—A-4, A-6

6 to 28 inches—clay, clay loam; 0 to 5 percent cobbles and stones and 0 to 15 percent pebbles (by weight), prismatic structure, hard, firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—CH, CL; estimated AASHTO classification—A-7

28 inches—weathered bedrock

*Range in depth to bedrock:* 20 to 30 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 3.5 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.10; T value—2; wind erodibility group—8

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

#### *Rubble Land*

*Position on landscape:* Side slopes of foothills

*Rock fragments on surface:* Kind—stones; percentage of surface covered—90

*Dominant present vegetation:* Barren

#### *Devada Soil*

*Position on landscape:* Shoulders and crests of foothills

*Parent material:* Kind—residuum; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, percentage of surface covered—90

#### *Typical profile*

0 to 4 inches—extremely cobbly loam, 45 to 55 percent cobbles and stones and 65 to 80 percent pebbles (by weight), granular structure; slightly hard, very friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—GC, GM-GC; estimated AASHTO classification—A-2

4 to 13 inches—gravelly clay, clay; 0 to 5 percent cobbles and stones and 0 to 45 percent pebbles (by weight), subangular blocky structure; very hard, very firm; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—CH, GC; estimated AASHTO classification—A-7

13 inches—unweathered bedrock

*Range in depth to bedrock:* 12 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—ridges of foothills; contrasting feature—bedrock exposed at the surface, distinctive present vegetation—barren

*Inclusion 2:* Position on landscape—back slopes of foothills adjacent to Rubble land; contrasting feature—more than 35 percent rock fragments throughout the profile; distinctive present vegetation—low sagebrush, Utah juniper

*Inclusion 3:* Position on landscape—south-facing back slopes of foothills; contrasting feature—less than 35 percent clay between depths of 4 and 13 inches; distinctive present vegetation—Wyoming big sagebrush, desert needlegrass

#### *Major Uses*

Rangeland, wildlife habitat

#### *Potential Native Plant Community (Table 32)*

#### *Elements of Wildlife Habitat*

*Suitability of Risley soil for named elements*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Devada soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

### Ratings for Selected Uses

*(Risley Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Poor—large stones

*(Devada Soil)*

*Suitability and limitations for the following use—*

Range and seeding: Poor—large stones, rooting depth

### Interpretive Groups

*Capability classification.* Risley soil—VIIc, nonirrigated;

Rubble and—VIIc; Devada soil—VIIc, nonirrigated

*Range site symbol:* Risley soil—026X022N, Devada soil—026X023N

## 314—Risley-Xman-Rock outcrop association

### Map Unit Setting

*Position on landscape:* Mountains

*Elevation:* 5,000 to 6,000 feet

*Climatic data (average annual).*

Precipitation—about 10 inches

Air temperature—about 48 degrees F

Frost-free season—about 100 days

### Composition

*Risley very stony loam, 15 to 30 percent slopes (Xerollic Haplargids - fine, montmorillonitic, mesic)—40 percent*

*Xman very stony loam, 4 to 30 percent slopes (Xerollic Haplargids - clayey, montmorillonitic, mesic, shallow)—30 percent*

*Rock outcrop—15 percent*

*Contrasting inclusions as follows—*

*Inclusion 1.* Old Camp very stony loam (Lithic Xero c Haplargids - loamy-skeletal, mixed, mesic)—4 percent

*Inclusion 2.* Mzel very gravelly coarse sandy loam (Lithic Torriorthents - loamy-skeletal, mixed, nonacid mesic)—4 percent

*Inclusion 3.* Xerollic Haplargids (Xerollic Haplargids - loamy-skeletal, mixed, mesic)—4 percent

*Inclusion 4.* Indiana stony fine sandy loam (Andic Argixerols - fine-loamy, mixed, mesic)—3 percent

### Risley Soil

*Position on landscape:* North- and east-facing back slopes of mountains

*Parent material:* Kind—colluvium, source—volcanic rock

*Dominant present vegetation:* Utah juniper, Wyoming big sagebrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel cobbles stones, percentage of surface covered—90

*Typical profile.*

0 to 3 inches—very stony loam, 25 to 40 percent cobbles and stones and 15 to 30 percent pebbles (by weight), granular structure, slightly hard friable, neutral (pH 6.8), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SC, CL, CL-ML, SM-SC, estimated AASHTO classification—A-4 A-6

3 to 23 inches—clay, clay loam; 0 to 5 percent cobbles and stones and 0 to 15 percent pebbles (by weight), prismatic structure, hard firm, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—CH, CL, estimated AASHTO classification—A-7

23 inches—weathered bedrock

*Range in depth to bedrock:* 20 to 30 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 4 inches

*Water supplying capacity:* 9 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.32; T value—2; wind erodibility group—7

*Hazard of erosion:* By water—severe, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate, to concrete—moderate

*Potential frost action:* Low

### Xman Soil

*Position on landscape:* Shoulders and ridges of mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—85

*Typical profile.*

0 to 2 inches—very stony loam, 20 to 50 percent cobbles and stones and 25 to 35 percent pebbles (by weight), platy structure, slightly hard, friable, neutral (pH 6.8), nonsaline (less than 2

mmhos/cm); nonsodic (SAR of less than 3), estimated unified classification—SM; estimated AASHTO classification—A-2, A-4

2 to 14 inches—clay, gravelly clay, 0 to 10 percent cobbles and stones and 0 to 30 percent pebbles (by weight); prismatic structure, hard, firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—CH; estimated AASHTO classification—A-7

14 to 29 inches—weathered bedrock

29 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.32; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

#### *Rock Outcrop*

*Position on landscape:* Tops and ridges of mountains

*Dominant present vegetation:* Barren

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—ridges of mountains; contrasting feature—less than 35 percent clay throughout the profile; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 2:* Position on landscape—convex crests of mountains; contrasting feature—severely eroded; distinctive present vegetation—sparse stand of Wyoming big sagebrush, purple sage, desert needlegrass

*Inclusion 3:* Position on landscape—lower side slopes of mountains; contrasting feature—bedrock at a depth of less than 40 inches; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 4:* Position on landscape—high-lying, concave back slopes of mountains; contrasting features—receives additional moisture from runoff; higher water supplying capacity; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 33)**

##### **Elements of Wildlife Habitat**

*Suitability of Risley soil for named elements:*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Xman soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

##### **Ratings for Selected Uses**

*(Risley Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Poor—large stones

*(Xman Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Poor—large stones

##### **Interpretive Groups**

*Capability classification:* Risley soil—VIIs, nonirrigated

Xman soil—VIIIs, nonirrigated, Rock outcrop—VIIIs

*Range site symbol:* Risley soil—027X017N Xman soil—026X025N

**350—Hunewill gravelly sandy loam, 2 to 4 percent slopes**

#### **Map Unit Setting**

*Position on landscape:* Alluvial fans

*Elevation:* 4,100 to 4,400 feet

*Climatic data (average annual)*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

#### **Composition**

*Hunewill gravelly sandy loam, 2 to 4 percent slopes*

(Xerollic Haplargids - loamy-skeletal, mixed, mesic)

*Contrasting inclusions as follows—*

*Inclusion 1:* Veta very gravelly sandy loam (Xerollic Camborthids - loamy-skeletal, mixed, mesic)—5 percent

*Inclusion 2:* Andic Argixerolls (Andic Argixerolls - loamy-skeletal, mixed, mesic)—5 percent

#### *Hunewill Soil*

*Position on landscape:* Toe slopes of alluvial fans

*Parent material:* Kind—alluvium; source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush,

Anderson peachbrush, Thurber needlegrass

**Rock fragments on surface:** Kind—gravel; percentage of surface covered—30

**Typical profile:**

- 0 to 3 inches—gravelly sandy loam; 0 to 5 percent cobbles and 25 to 50 percent pebbles (by weight); subangular blocky structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, SM; estimated AASHTO classification—A-1
- 3 to 13 inches—very gravelly clay loam, very gravelly sandy clay loam; 0 to 15 percent cobbles and 50 to 60 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, GC; estimated AASHTO classification—A-2, A-6
- 13 to 18 inches—very gravelly loam, very gravelly sandy loam; 0 to 25 percent cobbles and 50 to 60 percent pebbles (by weight); subangular blocky structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-1, A-2
- 18 to 60 inches or more—extremely gravelly sand, extremely cobbly loamy sand; 15 to 50 percent cobbles and 60 to 70 percent pebbles (by weight); massive soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GP, GP-GM; estimated AASHTO classification—A-1

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** In the upper 18 inches—moderately slow; below this depth—rapid

**Available water capacity:** 4 inches

**Water supplying capacity:** 8 inches

**Runoff:** Slow

**Hydrologic group:** B

**Erosion factors (upper layer):** K value—0.15, T value—2; wind erodibility group—4

**Hazard of erosion:** By water—slight; by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—moderate; to concrete—low

**Potential frost action:** Moderate

**Contrasting Inclusions**

**Inclusion 1:** Position on landscape—inset fans; contrasting feature—no layer of clay accumulation; distinctive present vegetation—Wyoming big sagebrush, spiny hopsage, Indian ricegrass

**Inclusion 2:** Position on landscape—drainageways; contrasting feature—receives additional moisture

from runoff; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

**Major Uses**

Irrigated cropland, homesites, rangeland, wildlife habitat

**Potential Native Plant Community (Table 34)**

**Elements of Wildlife Habitat**

**Suitability for named elements:**

Grain and seed crops (irrigated)—fair  
Domestic grasses and legumes (irrigated)—fair  
Wild herbaceous plants (nonirrigated)—fair  
Shrubs (nonirrigated)—fair  
Wetland plants—poor  
Shallow water areas—very poor

**Ratings for Selected Uses**

**Suitability and limitations for the following uses—**

Rangeland seeding: Fair—too arid  
Shallow excavations: Severe—culbanks cave  
Local roads and streets: Moderate—frost action, large stones

**Interpretive Groups**

**Capability classification:** IIIa, irrigated, and VIc, nonirrigated

**Range site symbol:** Q26X016N

**351—Hunewill very gravelly sandy loam, 4 to 15 percent slopes**

**Map Unit Setting**

**Position on landscape:** Alluvial fans

**Elevation:** 4,100 to 4,400 feet

**Climatic data (average annual):**

Precipitation—about 9 inches  
Air temperature—about 50 degrees F  
Frost-free season—about 120 days

**Composition**

**Hunewill very gravelly sandy loam, 4 to 15 percent slopes (Xerollic Haplargids - loamy-skeletal, mixed, mesic)**

**Contrasting inclusions as follows—**

**Inclusion 1:** Veta very gravelly sandy loam (Xerollic Camborthids - loamy-skeletal, mixed, mesic)—5 percent

**Inclusion 2:** Andic Argixerolls (Andic Argixerolls - loamy-skeletal, mixed, mesic)—5 percent

*Hunewill Soil*

**Position on landscape:** Upper part of alluvial fans

**Parent material:** Kind—alluvium; source—volcanic rock

**Dominant present vegetation:** Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass

**Rock fragments on surface:** Kind—gravel; percentage of surface covered—50

**Typical profile:**

0 to 5 inches—very gravelly sandy loam; 0 to 10 percent cobbles and 50 to 70 percent pebbles (by weight); subangular blocky structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-1

5 to 11 inches—very gravelly clay loam, very gravelly sandy clay loam; 0 to 15 percent cobbles and 50 to 60 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, GC; estimated AASHTO classification—A-2, A-6

11 to 18 inches—very gravelly loam, very gravelly sandy loam; 0 to 25 percent cobbles and 50 to 60 percent pebbles (by weight); subangular blocky structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-1, A-2

18 to 60 inches or more—extremely gravelly sand, extremely cobbly loamy sand; 15 to 50 percent cobbles and stones and 60 to 70 percent pebbles (by weight); massive; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GP, GP-GM; estimated AASHTO classification—A-1

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** In the upper 18 inches—moderately slow; below this depth—rapid

**Available water capacity:** 4 inches

**Water supplying capacity:** 8 inches

**Runoff:** Medium

**Hydrologic group:** B

**Erosion factors (upper layer):** K value—0.10; T value—2; wind erodibility group—5

**Hazard of erosion:** By water—slight; by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—moderate; to concrete—low

**Potential frost action:** Moderate

*Contrasting Inclusions*

**Inclusion 1:** Position on landscape—inset fans, contrasting feature—no layer of clay accumulation; distinctive present vegetation—Wyoming big sagebrush, spiny hopsage, Indian ricegrass

**Inclusion 2:** Position on landscape—drainageways; contrasting feature—receives additional moisture from runoff; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

**Major Uses**

**Current uses:** Rangeland, wildlife habitat

**Potential foreseeable use:** Homesites

**Potential Native Plant Community (Table 35)****Elements of Wildlife Habitat**

**Suitability for named elements:**

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

**Ratings for Selected Uses**

**Suitability and limitations for the following uses—**

Rangeland seeding: Poor—small stones too and

Shallow excavations: Severe—claybanks cave

Local roads and streets: Moderate—slope, frost action, large stones

**Interpretive Groups**

**Capability classification:** VIIc, nonirrigated

**Range site symbol:** Q26X016N

**381—Veta very gravelly sandy loam, 2 to 8 percent slopes**

**Map Unit Setting**

**Position on landscape:** Alluvial fans

**Elevation:** 4,600 to 5,400 feet

**Climatic data (average annual)**

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

**Composition**

**Veta very gravelly sandy loam, 2 to 8 percent slopes (Xerollic Camborthids - loamy-skeletal, mixed mesic)**

**Contrasting inclusions as follows—**

**Inclusion 1:** Hunewill very gravelly sandy loam (Xerollic Haplargids - loamy-skeletal, mixed mesic); 7 percent



**Inclusion 2:** Ackley gravelly sandy loam (Xerollic Hapargids - fine-loamy mixed, mesic)—3 percent

#### *Veta Soil*

**Position on landscape:** Alluvial fans

**Parent material:** Kind: alluvium, source—various kinds of rock

**Dominant present vegetation:** Wyoming big sagebrush, spiny hopsage, Indian ricegrass

**Rock fragments on surface:** Kind—grave, percentage of surface covered—50

#### *Typical profile*

0 to 6 inches—very gravelly sandy loam; 0 to 25 percent cobbles and 50 to 65 percent pebbles (by weight); platy structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-1

6 to 20 inches—extremely gravelly loam, very gravelly sandy loam; 10 to 30 percent cobbles and 50 to 70 percent pebbles (by weight); subangular blocky structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-1, A-2

20 to 60 inches or more—stratified extremely gravelly loamy sand to very gravelly loam; 10 to 25 percent cobbles and 50 to 80 percent pebbles (by weight); massive, loose; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GM GP-GM; estimated AASHTO classification—A-1

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately rapid

**Available water capacity:** 3.5 inches

**Water supplying capacity:** 8 inches

**Runoff:** Medium

**Hydrologic group:** B

**Erosion factors (upper layer):** K value—0.10; T value—5; wind erodibility group—8

**Hazard of erosion:** By water—slight; by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—high; to concrete—low

**Potential frost action:** Moderate

#### *Contrasting Inclusions*

**Inclusion 1:** Position on landscape—remnants of older alluvial fans, contrasting feature—layer of clay accumulation, distinctive present vegetation—Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass

**Inclusion 2:** Position on landscape—toe slopes of alluvial fans, contrasting feature—less than 35 percent gravel throughout the profile, distinctive present vegetation—Wyoming big sagebrush, Anderson peach brush, Thurber needlegrass

#### **Major Uses**

**Current uses:** Rangeland, wildlife habitat

**Potential foreseeable use:** Homesites

#### **Potential Native Plant Community (Table 36)**

#### **Elements of Wildlife Habitat**

**Suitability for named elements:**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

**Suitability and limitations for the following uses—**

Rangeland seeding: Poor—small stones

Shallow excavations: Severe—culbunk cave

Local roads and streets: Moderate—frost action, large stones

#### **Interpretive Groups**

**Capability classification:** VIIc nonirrigated

**Range site symbol:** 026X024N

#### **480—Olac-Bombadil-Rock outcrop association**

#### **Map Unit Setting**

**Position on landscape:** Foothills

**Elevation:** 4,600 to 5,200 feet

**Climatic data (average annual):**

Precipitation—about 9 inches

Air temperature—about 48 degrees F

Frost-free season—about 110 days

#### **Composition**

**Olac:** very stony sandy loam, 15 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—50 percent

**Bombadil:** stony loam, 8 to 30 percent slopes (Lithic Xerollic Haplargids - loamy, mixed, mesic)—30 percent

**Rock outcrop:** 10 percent

**Contrasting inclusions as follows—**

**Inclusion 1:** Lithic Xerollic Haplargids (Lithic Xerollic Haplargids - clayey, montmorillonitic, mesic)—5 percent

**Inclusion 2:** Indiano stony sandy loam (Andic Argixerolls - fine-loamy mixed, mesic)—3 percent

*Inclusion 3:* Xerollic Haplargids (Xerollic Haplargids - loamy-skeletal, mixed, mesic)—2 percent

#### *Olar Soil*

*Position on landscape:* Back slopes and crests of foothills

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—90

#### *Typical profile:*

0 to 3 inches—very stony sandy loam, 30 to 55 percent cobbles and stones and 30 to 50 percent pebbles (by weight), granular structure, slightly hard, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GM, GM-GC, SM, SM-SC, estimated AASHTO classification—A-1, A-2

3 to 10 inches—extremely gravelly loam, 10 to 20 percent cobbles and stones and 65 to 80 percent pebbles (by weight); subangular blocky structure; hard, firm, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 8), estimated Unified classification—GC, estimated AASHTO classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 1 inch

*Water supplying capacity:* 6 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1, wind erodibility group—5

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

#### *Bombardil Soil*

*Position on landscape:* Toe slopes and lower side slopes of foothills

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush, spiny hopsage, Nevada bluegrass, Indian ricegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—75

#### *Typical profile:*

0 to 3 inches—stony loam, 10 to 20 percent cobbles and stones and 25 to 40 percent pebbles (by weight); subangular blocky structure; soft, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SM, estimated AASHTO classification—A-4

3 to 10 inches—gravelly loam, 0 to 10 percent cobbles and stones and 10 to 30 percent pebbles; subangular blocky structure; hard, friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—CL, CL-M, estimated AASHTO classification—A-4, A-6

10 inches—unweathered bedrock

*Range in depth to bedrock:* 7 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 6 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.32, T value—1, wind erodibility group—6

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

#### *Rock Outcrop*

*Position on landscape:* Ridges and back slopes of foothills

*Dominant present vegetation:* Barren

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—ridges of foothills; contrasting feature—clayey at a depth of more than 4 inches, distinctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Inclusion 2:* Position on landscape—concave north-facing toe slopes and back slopes of foothills, contrasting features—bedrock at a depth of more than 20 inches, higher water supplying capacity, distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 3:* Position on landscape—south-facing basin floor remnants, contrasting feature—higher water supplying capacity, distinctive present vegetation—Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 37)****Elements of Wildlife Habitat***Suitability of Olac soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

*Suitability of Bombadil soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

**Ratings for Selected Uses***(Olac Soil)**Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, large stones

*(Bombadil Soil)**Suitability and limitation for the following use—*

Rangeland seeding: Poor—droughty

**Interpretive Groups**

*Capability classification.* Olac soil—Vlts, nonirrigated;  
Bombadil soil—Vlts, nonirrigated; Rock outcrop—  
vls

*Range site symbol:* Olac soil—026X025N; Bombadil  
soil—027X008N

**489—Olac-Old Camp-Rock outcrop association****Map Unit Setting**

*Position on landscape.* Hills, mountains

*Elevation:* 5,000 to 8,400 feet

*Climatic data (average annual)*

Precipitation—about 9 inches  
Air temperature—about 49 degrees F  
Frost-free season—about 110 days

**Composition**

*Olac extremely stony loam, 0 to 50 percent slopes (Lithic  
Xerollic Haplargids - loamy-skeletal, mixed,  
mesic)—50 percent*

*Old Camp extremely stony sandy loam, 30 to 50 percent  
slopes (Lithic Xerollic Haplargids - loamy-skeletal,  
mixed, mesic)—25 percent*

*Rock outcrop—10 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Rubble land—5 percent

*Inclusion 2:* Cagle very stony loam (Aridic  
Argixerolls - fine, montmorillonitic, mesic)—4  
percent

*Inclusion 3:* Oppio very stony loam (Xerollic  
Haplargids - fine, montmorillonitic, mesic)—3  
percent

*Inclusion 4:* Veta very gravelly sandy loam (Xerollic  
Camborthids - loamy-skeletal mixed, mesic)—3  
percent

**Olac Soil**

*Position on landscape:* Back slopes and ridges of hills  
and mountains

*Parent material:* Kind—residuum, colluvium; source—  
volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber  
needlegrass, bottlebrush, squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles,  
stones; percentage of surface covered—90

*Typical profile*

0 to 3 inches—extremely stony loam; 25 to 55  
percent cobbles and stones and 45 to 65 percent  
pebbles (by weight); granular structure; slightly  
hard, very friable, neutral (pH 7.0), nonsaline (less  
than 2 mmhos/cm); nonsodic (SAR of less than  
3); estimated Unified classification—GC;  
estimated AASHTO classification—A-2

3 to 10 inches—extremely gravelly loam, extremely  
gravelly clay loam; 10 to 20 percent cobbles and  
stones and 65 to 80 percent pebbles (by weight);  
subangular blocky structure, hard, firm; neutral  
(pH 7.0); nonsaline (less than 2 mmhos/cm);  
nonsodic (SAR of less than 3); estimated Unified  
classification—GC; estimated AASHTO  
classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60  
inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 0.5 inch

*Water supplying capacity:* 5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—  
1; wind erodibility group—8

*Hazard of erosion:* By water—moderate; by wind—  
slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

**Old Camp Soil**

*Position on landscape:* North- and east-facing toe  
slopes and concave back slopes of hills and  
mountains

*Parent material:* Kind—residuum, colluvium; source—  
volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush,  
green ephedra, desert needlegrass

**Rock fragments on surface:** Kind—gravel, cobbles, stones, percentage of surface covered—90

**Typical profile**

0 to 2 inches—extremely stony sandy loam; 25 to 55 percent cobbles and stones and 35 to 45 percent pebbles (by weight); granular structure; soft very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-1

2 to 14 inches—very cobbly clay loam, extremely stony sandy clay loam; 35 to 50 percent cobbles and stones and 50 to 65 percent pebbles (by weight); subangular blocky structure; hard, firm; moderately alkaline (pH 8.2); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—GC; estimated AASHTO classification—A-2 A-6

14 inches—unweathered bedrock

**Range in depth to bedrock:** 10 to 20 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 1.5 inch

**Water supplying capacity:** 5.5 inches

**Runoff:** Rapid

**Hydrologic group:** D

**Erosion factors (upper layer):** K value—0.17; T value—1; wind erodibility group—B

**Hazard of erosion:** By water—severe; by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—high to concrete—low

**Potential frost action:** Moderate

**Rock Outcrop**

**Position on landscape:** Ridges and back slopes of mountains and hills

**Dominant present vegetation:** Barren

**Contrasting Inclusions**

**Inclusion 1:** Position on landscape—plane to concave back slopes of hills and mountains; contrasting feature—more than 90 percent stones on the surface; distinctive present vegetation—barren

**Inclusion 2:** Position on landscape—concave, north-facing back slopes of hills and mountains; contrasting features—clayey at a depth of 4 inches; bedrock at a depth of more than 20 inches; distinctive present vegetation—singleleaf pinyon, Utah juniper

**Inclusion 3:** Position on landscape—plateaus and crests of hills and mountains; contrasting feature—clayey at a depth of 4 inches; distinctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush squirreltail

**Inclusion 4:** Position on landscape—drainageways; contrasting features—bedrock at a depth of more than 60 inches; gravelly sandy loam throughout the profile; distinctive present vegetation—Wyoming big sagebrush, spiny hopsage, Indian ricegrass

**Inclusion of minor extent:** Position on landscape—alluvial fans; contrasting feature—indurated hardpan at a depth of 10 to 20 inches; distinctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush squirreltail

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 38)**

**Elements of Wildlife Habitat**

**Suitability of Olac soil for named elements.**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Suitability of Old Camp soil for named elements.**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Ratings for Selected Uses**

**(Olac Soil)**

**Suitability and limitations for the following use—**

Rangeland seeding: Poor—droughty, large stones, small stones

**(Old Camp Soil)**

**Suitability and limitations for the following use—**

Rangeland seeding: Poor—droughty, large stones

**Interpretive Groups**

**Capability classification:** Olac soil—VI s, nonirrigated; Old Camp soil—VII s, nonirrigated; Rock outcrop—VII s

**Range site symbol:** Olac soil—026X025N; Old Camp soil—026X022N

**484—Olac-Old Camp-later association**

**Map Unit Setting**

**Position on landscape:** Mountains

**Elevation:** 5,200 to 6,600 feet

**Climatic data (average annual):**

Precipitation—about 10 inches

Air temperature—about 48 degrees F

Frost-free season—about 100 days

**Composition**

**Olac very stony sandy loam, 15 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—35 percent**

*Old Camp very stony loam, 30 to 50 percent slopes*  
(Lithic Xeroillic Haplargids - loamy-skeletal, mixed,  
mesic)—25 percent

*Old Camp very stony sandy loam, 30 to 50 percent slopes*  
(Aridic Argixerolls - loamy-skeletal, mixed, mesic)—  
25 percent

*Contrasting inclusions as follows—*

*Inclusion 1:* Burnborough very gravelly loam, 50 to  
75 percent slopes (Aridic Argixerolls - loamy-  
skeletal, mixed, frigid)—8 percent

*Inclusion 2:* Rock outcrop—5 percent

*Inclusion 3:* Rubble land—2 percent

#### *Oiac Soil*

*Position on landscape:* Ridges, convex back slopes,  
crests of mountains

*Parent material:* Kind—residuum, colluvium; source—  
volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber  
needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles,  
stones; percentage of surface covered—80

*Typical profile*

0 to 3 inches—very stony sandy loam; 30 to 55  
percent cobbles and stones and 30 to 50 percent  
pebbles (by weight); granular structure, slightly  
hard, very friable; neutral (pH 7.0), nonsaline (less  
than 2 mmhos/cm); nonsodic (SAR of less than  
3); estimated Unified classification—GM, GM-GC,  
SM, SM-SC; estimated AASHTO classification—  
A-1, A-2

3 to 10 inches—extremely gravelly loam; 10 to 20  
percent cobbles and stones and 65 to 80 percent  
pebbles (by weight); subangular blocky structure,  
hard, firm; neutral (pH 7.0), nonsaline (less than 2  
mmhos/cm); nonsodic (SAR of less than 8);  
estimated Unified classification—GC; estimated  
AASHTO classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60  
inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 1 inch

*Water supplying capacity:* 6 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—  
1, wind erodibility group—5

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

#### *Old Camp Soil*

*Position on landscape:* Plane to concave back slopes  
of mountains

*Parent material:* Kind—colluvium; source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush,  
green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles,  
stones; percentage of surface covered—90

*Typical profile*

0 to 2 inches—very stony loam, 25 to 55 percent  
cobbles and stones and 35 to 45 percent pebbles  
(by weight); granular structure; soft, very friable,  
neutral (pH 6.8), nonsaline (less than 2  
mmhos/cm); nonsodic (SAR of less than 3);  
estimated Unified classification—GM, GM-GC,  
SM, SM-SC; estimated AASHTO classification—  
A-2, A-4

2 to 14 inches—very cobbly clay loam, extremely  
stony sandy clay loam; 35 to 50 percent cobbles  
and stones and 50 to 65 percent pebbles (by  
weight); subangular blocky structure, hard, firm,  
mildly alkaline (pH 7.6); nonsaline (less than 2  
mmhos/cm); nonsodic (SAR of less than 13);  
estimated Unified classification—GC; estimated  
AASHTO classification—A-2, A-6

14 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60  
inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 6 inches

*Runoff:* Very rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—  
1, wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Moderate

#### *Ister Soil*

*Position on landscape:* Concave, north-facing back  
slopes of mountains

*Parent material:* Kind—residuum, colluvium; source—  
volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush,  
antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles,  
stones; percentage of surface covered—80

*Typical profile*

0 to 7 inches—very stony sandy loam, 20 to 30  
percent cobbles and stones and 25 to 45 percent  
pebbles (by weight); granular structure, slightly  
hard, very friable; neutral (pH 6.8), nonsaline (less

than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SM, GM, estimated AASHTO classification—A-2, A-4  
 7 to 25 inches—very stony sandy clay loam, very stony clay loam, 35 to 45 percent cobbles and stones and 20 to 45 percent pebbles (by weight), subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, SC, estimated AASHTO classification—A-2, A-6, A-7  
 25 inches—unweathered bedrock  
*Range in depth to bedrock:* 25 to 40 inches  
*Depth to seasonal high water table:* More than 60 inches  
*Hazard of flooding:* None  
*Permeability:* Moderately slow  
*Available water capacity:* 3 inches  
*Water supplying capacity:* 9 inches  
*Runoff:* Rapid  
*Hydrologic group:* C  
*Erosion factors (upper layer):* K value—0.10; T value—2, wind erodibility group—8  
*Hazard of erosion:* By water—moderate; by wind—slight  
*Shrink-swell potential:* Moderate  
*Corrosivity:* To steel—moderate, to concrete—low  
*Potential frost action:* Moderate

#### Contrasting Inclusions

- Inclusion 1:* Position on landscape—very steep, north-facing concave back slopes at the higher elevations of mountains; contrasting features—receives additional moisture from runoff; thick dark-colored upper layer; distinctive present vegetation—mountain big sagebrush, antelope bitterbrush, Idaho fescue  
*Inclusion 2:* Position on landscape—ridges and back slopes of mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren  
*Inclusion 3:* Position on landscape—plane to concave back slopes of mountains; contrasting feature—more than 90 percent stones on the surface; distinctive present vegetation—barren

#### Major Uses

Range and, wildlife habitat

#### Potential Native Plant Community (Table 39)

#### Elements of Wildlife Habitat

*Suitability of Olac soil for named elements:*  
 Wild herbaceous plants (nonirrigated)—poor  
 Shrubs (nonirrigated)—poor  
*Suitability of Old Camp soil for named elements:*  
 Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor  
*Suitability of Ister soil for named elements:*  
 Wild herbaceous plants (nonirrigated)—fair  
 Shrubs (nonirrigated)—fair

#### Ratings for Selected Uses

##### (Olac Soil)

*Suitability and limitations for the following use—*

Range land seeding: Poor—droughty, large stones

##### (Old Camp Soil)

*Suitability and limitations for the following use—*

Range land seeding: Poor—droughty, large stones

##### (Ister Soil)

*Suitability and limitation for the following use—*

Range land seeding: Poor—large stones

#### Interpretive Groups

*Capability classification:* Olac soil—VIIIs, nonirrigated  
 Old Camp soil—VIIIs, nonirrigated; Ister soil—VIIs, nonirrigated

*Range site symbol:* Olac soil—026X025N, Old Camp soil—026X022N, Ister soil—026X010N

#### 485—Olac-Chalco-Haar association

#### Map Unit Setting

*Position on landscape:* Hills, pediments  
*Elevation:* 5,000 to 6,000 feet  
*Climatic data (average annual):*  
 Precipitation—about 8 inches  
 Air temperature—about 50 degrees F  
 Frost-free season—about 110 days

#### Composition

*Olac very stony loam, 30 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—45 percent*

*Chalco very stony loam, 15 to 50 percent slopes (Xerollic Haplargids - clayey, montmorillonitic, mesic, shallow)—25 percent*

*Haar loam, 15 to 50 percent slopes (Xeric Tororthents - loamy, mixed, nonacid, mesic, shallow)—15 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—8 percent

*Inclusion 2:* Fulstone cobbly loam (Abruptic Xerollic Durargids - clayey, montmorillonitic, mesic, shallow)—3 percent

*Inclusion 3:* Rock outcrop—2 percent

*Inclusion 4:* Rubble land—2 percent

*Ojac Soil*

*Position on landscape:* Back slopes of hills

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—80

*Typical profile*

0 to 3 inches—very stony loam, 25 to 55 percent cobbles and stones and 45 to 65 percent pebbles (by weight); granular structure; slightly hard, very friable, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2

3 to 10 inches—extremely gravelly clay loam, extremely gravelly loam; 10 to 20 percent cobbles and stones and 65 to 80 percent pebbles (by weight); subangular blocky structure; hard, firm, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 0.5 inch

*Water supplying capacity:* 5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

*Chalco Soil*

*Position on landscape:* Hills, pediments

*Parent material:* Kind—alluvium, colluvium; source—tuff

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile*

0 to 3 inches—very stony loam; 30 to 45 percent cobbles and stones and 30 to 40 percent pebbles (by weight); platy structure; slightly hard, very friable, neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, SM-SC; estimated AASHTO classification—A-4, A-6

3 to 15 inches—clay, silty clay; 0 to 5 percent cobbles and stones and 0 to 25 percent pebbles (by weight); prismatic structure; hard, firm, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CH; estimated AASHTO classification—A-7

15 inches—weathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Very slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—7

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

*Haar Soil*

*Position on landscape:* Erosional back slopes of hills

*Parent material:* Kind—residuum, colluvium; source—soft tuff

*Dominant present vegetation:* Singleleaf pinyon, Utah juniper

*Rock fragments on surface:* Kind—cobbles; percentage of surface covered—less than 5

*Typical profile*

0 to 4 inches—loam; 0 to 15 percent cobbles and stones and 0 to 25 percent pebbles (by weight); platy structure; slightly hard, friable, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CL-ML; estimated AASHTO classification—A-7

4 inches—weathered bedrock

*Range in depth to bedrock:* 4 to 10 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 0.5 inch

*Water supplying capacity:* 5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.43; T value—1; wind erodibility group—5

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate



### Contrasting Inclusions

- Inclusion 1:** Position on landscape—concave back slopes and toe slopes of hills; contrasting feature—higher water supplying capacity; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass.
- Inclusion 2:** Position on landscape—alluvial fans; contrasting feature—indurated hardpan at a depth of 10 to 20 inches; distinctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush squirrel tail.
- Inclusion 3:** Position on landscape—edges, shoulders, and back slopes of hills and pediments; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren.
- Inclusion 4:** Position on landscape—plane to concave back slopes of hills and pediments; contrasting feature—more than 90 percent stones on the surface; distinctive present vegetation—barren.

### Major Uses

Rangeland wildlife habitat

### Potential Native Plant Community (Table 40)

#### Woodland

(Haar Soil)

Site index for common trees: Singleleaf pinyon—10, Utah juniper—10

Most important native understory plants: Wyoming big sagebrush, antelope bitterbrush, green ephedra, bottlebrush squirrel tail, Thurber needlegrass.

### Elements of Wildlife Habitat

Suitability of Olac soil for named elements:

Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

Suitability of Chalco soil for named elements:

Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

Suitability of Haar soil for named elements:

Wild herbaceous plants (nonirrigated)—poor  
Coniferous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

### Ratings for Selected Uses

(Olac Soil)

Suitability and limitations for the following use—

Range and seeding: Poor—droughty, large stones

(Chalco Soil)

Suitability and limitation for the following use—

Range and seeding: Poor—large stones

(Haar Soil)

Suitability and limitations for the following use—

Range and seeding: Poor—droughty, depth to rock, erodes easily

### Interpretive Groups

Capability classification: Olac soil—V1s, nonirrigated; Chalco soil—V1s, nonirrigated; Haar soil—V1s, nonirrigated

Range site symbol: Olac soil—026X025N, Chalco soil—026X025N

Woodland suitability group: Haar soil—1r

### 487—Olac-Cagle-Opio association

#### Map Unit Setting

Position on landscape: Mountains

Elevation: 6,000 to 6,400 feet

Climatic data (average annual)

Precipitation—about 11 inches

Air temperature—about 49 degrees F

Frost-free season—about 110 days

#### Composition

Olac very stony loam, 30 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—50 percent

Cagle very stony loam, 15 to 50 percent slopes (Aridic Argixerolls - fine, montmorillonitic, mesic)—20 percent

Opio extremely stony loam, 4 to 30 percent slopes (Xerollic Haplargids - fine, montmorillonitic, mesic)—15 percent

Contrasting inclusions as follows—

Inclusion 1: Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—5 percent

Inclusion 2: Duoqo very stony sandy loam (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—4 percent

Inclusion 3: Rock outcrop—3 percent

Inclusion 4: Rubble land—3 percent

#### Olac Soil

Position on landscape: Back slopes of mountains

Parent material: Kind—residuum, colluvium; source—volcanic rock

Dominant present vegetation: Low sagebrush, Thurber needlegrass, bottlebrush squirrel tail

Rock fragments on surface: Kind—gravel, cobbles, stones; percentage of surface covered—80

Typical profile:

0 to 5 inches—very stony loam; 25 to 55 percent cobbles and stones and 45 to 65 percent pebbles (by weight); granular structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification: GC; estimated AASHTO classification—A-2

5 to 10 inches—extremely gravelly clay loam, extremely gravelly loam, 10 to 20 percent cobbles and stones and 65 to 80 percent pebbles (by weight), subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 0.5 inch

*Water supplying capacity:* 5.5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—8

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### *Cagle Soil*

*Position on landscape:* North- and east-facing back slopes and shoulders of mountains

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Singleleaf pinyon, Utah juniper

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—85

*Typical profile:*

0 to 4 inches—very stony loam, 30 to 50 percent cobbles and stones and 30 to 50 percent pebbles (by weight); granular structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, SC; estimated AASHTO classification—A-6

4 to 24 inches—gravelly clay, gravelly clay loam; 0 to 5 percent cobbles and 25 to 50 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CL, CH, GC; estimated AASHTO classification—A-7

24 inches—weathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 3.5 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.24; T value—2; wind erodibility group—8

*Hazard of erosion:* By water—severe, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate to concrete—low

*Potential frost action:* Low

#### *Oppio Soil*

*Position on landscape:* Plateaus and shoulders of mountains

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirrel tail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile:*

0 to 6 inches—extremely stony loam, 45 to 60 percent cobbles and stones and 40 to 55 percent pebbles (by weight); platy structure; hard friable; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, ML; estimated AASHTO classification—A-4

6 to 27 inches—gravelly clay, 0 to 5 percent cobbles and stones and 40 to 50 percent pebbles (by weight); prismatic structure; extremely hard, very fine; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-7

27 inches—unweathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 4 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.24; T value—2; wind erodibility group—8

*Hazard of erosion:* By water—moderate, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high; to concrete—moderate

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—concave back slopes and toe slopes of mountains; contrasting feature—receives additional moisture from runoff

distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 2:* Position on landscape—north-facing, concave back slopes; contrasting feature—receives additional moisture from runoff; distinctive present vegetation—singleleaf pinyon, Utah juniper

*Inclusion 3:* Position on landscape—ridges and back slopes of mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

*Inclusion 4:* Position on landscape—plane to concave back slopes of mountains; contrasting feature—more than 90 percent stones on the surface; distinctive present vegetation—barren

### Major Uses

Rangeland wildlife habitat

### Potential Native Plant Community (Table 41)

#### Woodland

(Cagle Soil)

*Site index for common trees:* Singleleaf pinyon—35, Utah juniper—35

*Most important native understory plants:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

#### Elements of Wildlife Habitat

*Suitability of Olac soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

*Suitability of Cagle soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair  
Coniferous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—fair

*Suitability of Oppio soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair  
Shrubs (nonirrigated)—fair

### Ratings for Selected Uses

(Olac Soil)

*Suitability and limitations for the following use—*

Rangeland seedling: Poor—droughty, large stones

(Cagle Soil)

*Suitability and limitations for the following use—*

Range and seedling: Poor—large stones, slope

(Oppio Soil)

*Suitability and limitation for the following use—*

Rangeland seedling: Poor—large stones

### Interpretive Groups

*Capability classification:* Olac soil—Vils, nonirrigated; Cagle soil—Vils, nonirrigated; Oppio soil—Vils, nonirrigated

*Range site symbol:* Olac soil—026X025N, Oppio soil—026X025N

*Woodland suitability group:* Cagle soil—1r

### 488—Olac-Rubble land-Indiano association

#### Map Unit Setting

*Position on landscape:* Mountains, hills

*Elevation:* 5,000 to 6,300 feet

*Climatic data (average annual):*

Precipitation—about 10 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

#### Composition

*Olac extremely cobbly loam, 8 to 30 percent slopes*

(Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—45 percent

*Rubble land—25 percent*

*Indiano very stony sandy loam, 15 to 50 percent slopes*

(Andic Argixerolls - fine-loamy, mixed, mesic)—15 percent

*Contrasting inclusions as follows—*

*Inclusion 1:* Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—6 percent

*Inclusion 2:* Risley very stony loam (Xerollic Haplargids - fine, montmorillonitic, mesic)—5 percent

*Inclusion 3:* Rock outcrop—4 percent

#### Olac Soil

*Position on landscape:* Back slopes and shoulders of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirrel-tail

*Rock fragments on surface:* Kind—gravel, cobbles, percentage of surface covered—90

*Typical profile:*

0 to 3 inches—extremely cobbly loam; 45 to 65 percent cobbles and 65 to 75 percent pebbles (by weight); granular structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM-GC, GM; estimated AASHTO classification—A-1, A-2  
3 to 10 inches—extremely gravelly clay loam; 10 to 20 percent cobbles and 65 to 80 percent pebbles (by weight); subangular blocky structure; hard firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GL; estimated AASHTO classification—A-2  
10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 0.5 inch

*Water supplying capacity:* 6 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.05, T value—1, wind erodibility group—8

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

#### *Rubble Land*

*Position on landscape:* Back slopes of mountains and hills

*Dominant present vegetation:* Barren

#### *Indiano Soil*

*Position on landscape:* North-facing back slopes of mountains and hills

*Parent material:* Kind—colluvium, residuum; source—volcanic rock

*Dominant present vegetation:* Big sagebrush, bluegrass, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—80

*Typical profile*

0 to 13 inches—very stony sandy loam; 20 to 25 percent cobbles and stones and 20 to 35 percent pebbles (by weight), subangular blocky structure; soft, very friable, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-1, A-2

13 to 33 inches—gravely clay loam, clay loam; 0 to 15 percent cobbles and stones and 15 to 40 percent pebbles (by weight), subangular blocky structure; hard friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, GC; estimated AASHTO classification—A-2, A-6, A-7

33 inches—unweathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 5 inches

*Water supplying capacity:* 11 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.32; T value—2; wind erodibility group—4

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—south-facing back slopes of mountains and hills; contrasting feature—layer of lime accumulation at a depth of 10 to 20 inches; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 2:* Position on landscape—south- and west-facing, convex back slopes of mountains and hills; contrasting feature—more than 35 percent clay between depths of 6 and 20 inches; distinctive present vegetation—Utah juniper, Wyoming big sagebrush, Thurber needlegrass

*Inclusion 3:* Position on landscape—ridges of mountains and hills; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

#### **Major Uses**

Rangeland, watershed

#### **Potential Native Plant Community (Table 42)**

#### **Elements of Wildlife Habitat**

*Suitability of Olac soil for named elements*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Indiano soil for named elements*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

#### **Ratings for Selected Uses**

*(Olac Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, large stones, depth to rock

*(Indiano Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, erodes easily

#### **Interpretive Groups**

*Capability classification:* Olac soil—V<sub>3</sub>s, nonirrigated

Rubble land—VIII<sub>3</sub>s, Indiano soil—V<sub>3</sub>is, nonirrigated

*Range site symbol:* Olac soil—026X025N, Indiano soil—027X054N

**489—Olac-Smallcone-Old Camp association**

### Map Unit Setting

*Position on landscape.* Hills, mountains (fig. 1)

*Elevation:* 4,400 to 5,400 feet

*Climatic data (average annual).*

Precipitation—about 10 inches

Air temperature—about 49 degrees F

Frost-free season—about 110 days

### Composition

*Olac very stony sandy loam, 15 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—35 percent*

*Smallcone very gravelly coarse sandy loam, 15 to 50 percent slopes (Lithic Xeric Torriorthents - loamy-skeletal, mixed, nonacid, mesic)—30 percent*



Figure 1—Smallcone-Old Camp association. Sparse cover of Jeffrey pine on Smallcone soils on upper part of hillsides. Old Camp soils on lower part

*Old Camp very stony loam, 15 to 50 percent slopes*  
(Lithic Xerollic Haplargids - loamy-skeletal, mixed,  
mesic)—25 percent

*Contrasting inclusions as follows—*

*Inclusion 1:* Rock outcrop—5 percent

*Inclusion 2:* Duco very stony loam (Lithic  
Argixerolls - loamy-skeletal, mixed, mesic)—3  
percent

*Inclusion 3:* Xarta extremely stony clay loam (Andic  
Durixerolls - fine, montmorillonitic, mesic)—2  
percent

#### *Ojac Soil*

*Position on landscape:* Back slopes and shoulders of  
hills and mountains

*Parent material:* Kind—residuum, colluvium; source—  
volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber  
need grass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles,  
stones; percentage of surface covered—80

*Typical profile*

0 to 3 inches—very stony sandy loam; 30 to 55  
percent cobbles and stones and 30 to 50 percent  
pebbles (by weight); granular structure; slightly  
hard, very friable; neutral (pH 7.0); nonsaline (less  
than 2 mmhos/cm); nonsodic (SAR of less than  
3); estimated Unified classification—GM-GC, GM,  
SM SM-SC; estimated AASHTO classification—  
A-1 A-2

3 to 10 inches—extremely gravelly loam; 10 to 20  
percent cobbles and stones and 65 to 80 percent  
pebbles (by weight); subangular blocky structure;  
hard firm; neutral (pH 7.0); nonsaline (less than 2  
mmhos/cm); nonsodic (SAR of less than 8);  
estimated Unified classification—GC; estimated  
AASHTO classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60  
inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 1 inch

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—  
1; wind erodibility group—5

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

#### *Smailcone Soil*

*Position on landscape:* Back slopes of hills and  
mountains

*Parent material:* Kind—residuum, colluvium, source—  
altered andesite

*Dominant present vegetation:* Ponderosa pine

*Rock fragments on surface:* Kind—gravel; percentage  
of surface covered—90

*Typical profile*

0 to 6 inches—very gravelly coarse sandy loam 0 to  
10 percent cobbles and stones and 50 to 75  
percent pebbles (by weight); massive; soft, very  
friable; strongly acid (pH 5.2); nonsaline (less  
than 2 mmhos/cm); nonsodic (SAR of less than  
3); estimated Unified classification—GM, SM GP-  
GM, SP SM estimated AASHTO classification—  
A-1

6 inches—weathered bedrock

*Range in depth to bedrock:* 4 to 10 inches

*Depth to seasonal high water table:* More than 60  
inches

*Hazard of flooding:* None

*Permeability:* Rapid

*Available water capacity:* Less than 0.5 inch

*Water supplying capacity:* 8 inches (water is extracted  
by plant roots in the bedrock)

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—  
1; wind erodibility group—6

*Hazard of erosion:* By water—moderate; by wind—  
slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate; to concrete—  
moderate

*Potential frost action:* Low

#### *Old Camp Soil*

*Position on landscape:* Back slopes and toe slopes of  
hills and mountains

*Parent material:* Kind—colluvium; source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush,  
green aphedra, desert need grass

*Rock fragments on surface:* Kind—gravel cobbles  
stones; percentage of surface covered—80

*Typical profile*

0 to 2 inches—very stony loam, 25 to 55 percent  
cobbles and stones and 35 to 55 percent pebbles  
(by weight); granular structure; soft, very friable;  
neutral (pH 6.8); nonsaline (less than 2  
mmhos/cm); nonsodic (SAR of less than 3);  
estimated Unified classification—GM, SM GM-  
GC, SM-SC; estimated AASHTO classification—  
A-2, A-4

2 to 14 inches—very cobbly clay loam, extremely  
stony sandy clay loam; 35 to 50 percent cobbles  
and stones and 50 to 65 percent pebbles (by  
weight); subangular blocky structure; hard firm  
mildly alkaline (pH 7.6); nonsaline (less than 2

mmHg/cm); nonsodic (SAR of less than 13);  
estimated Unified classification—GC; estimated  
AASHTO classification—A-2, A-6

14 inches: unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60  
inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 6 inches

*Runoff:* Very rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—  
1, wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—ridges and back  
slopes of hills and mountains; contrasting feature—  
bedrock exposed at the surface; distinctive present  
vegetation—barren

*Inclusion 2:* Position on landscape—north-facing,  
concave back slopes of hills and mountains,  
contrasting feature—receives additional moisture  
from runoff; distinctive present vegetation—  
singleleaf pinyon, Utah juniper

*Inclusion 3:* Position on landscape—concave back  
slopes of hills and mountains; contrasting feature—  
more than 35 percent clay between depths of 6 and  
20 inches; distinctive present vegetation—low  
sagebrush, antelope bitterbrush, Thurber  
need grass

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 43)**

##### **Woodland**

*(Smallcone Soil)*

*Site index for common trees:* Ponderosa pine—29

*Most important native understory plants:* Antelope  
bitterbrush, currant, rabbitbrush, eriogonum

##### **Elements of Wildlife Habitat**

*Suitability of Olac soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Smallcone soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Coniferous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Old Camp soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

*(Olac Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—droughty, large stones,  
depth to rock

*(Smallcone Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—depth to rock, droughty  
small stones

*(Old Camp Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, slope  
droughty

#### **Interpretive Groups**

*Capability classification:* Olac soil—VIs, nonirrigated

Smallcone soil—VIs, nonirrigated; Old Camp soil—  
VIs, nonirrigated

*Range site symbol:* Olac soil—026X025N; Old Camp  
soil—026X022N

*Woodland suitability group:* Smallcone soil—2r

#### **519—Loomer-Zephan-Olac association**

##### **Map Unit Setting**

*Position on landscape:* Hills, mountains

*Elevation:* 5,200 to 6,000 feet

*Climatic data (average annual):*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 110 days

##### **Composition**

*Loomer extremely cobbly loam, 15 to 30 percent slopes*  
(Lithic Argixerolls - clayey-skeletal, montmorillonitic  
mesic)—35 percent

*Zephan extremely cobbly loam, 15 to 50 percent slopes*  
(Xerollic Haplargids - clayey-skeletal,  
montmorillonitic, mesic)—35 percent

*Olac extremely stony loam, 15 to 50 percent slopes*  
(Lithic Xerollic Haplargids - loamy-skeletal, mixed,  
mesic)—20 percent

*Contrasting inclusions as follows—*

*Inclusion 1:* Xerollic Haplargids (Xerollic  
Haplargids - loamy-skeletal, mixed, mesic)—5  
percent

*Inclusion 2:* Theon very stony loam (Lithic  
Haplargids - loamy-skeletal, mixed, mesic)—3  
percent

*Inclusion 3:* Veta very gravelly sandy loam (Xerollic  
Camborthids - loamy-skeletal, mixed, mesic)—2  
percent



*Loomer Soil*

*Position on landscape:* North- and east-facing back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles; percentage of surface covered—85

*Typical profile:*

0 to 4 inches—extremely cobbly loam; 40 to 55 percent cobbles and stones and 55 to 65 percent pebbles (by weight); subangular blocky structure; slightly hard, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, GM-GC; estimated AASHTO classification—A-2

4 to 15 inches—extremely cobbly clay loam; 30 to 55 percent cobbles and stones and 65 to 80 percent pebbles (by weight); subangular blocky structure; hard, firm, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-2

15 inches—unweathered bedrock

*Range in depth to bedrock:* 14 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 6 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.10; T value—1; wind erodibility group—B

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Low

*Zephan Soil*

*Position on landscape:* South- and west-facing back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—andesite

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile:*

0 to 8 inches—extremely cobbly loam; 40 to 45 percent cobbles and 50 to 80 percent pebbles (by weight); platy structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3);

estimated Unified classification—GM, estimated AASHTO classification—A-1, A-2

8 to 35 inches—very cobbly clay; 30 to 40 percent cobbles and stones and 30 to 40 percent pebbles (by weight); subangular blocky structure; hard, firm, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-7

35 to 42 inches—weathered bedrock

42 inches—unweathered bedrock

*Range in depth to bedrock:* 25 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 4 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.10; T value—2; wind erodibility group—B

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate, to concrete—moderate

*Potential frost action:* Moderate

*Oiac Soil*

*Position on landscape:* Shoulders of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile:*

0 to 3 inches—extremely stony loam; 25 to 55 percent cobbles and stones and 45 to 65 percent pebbles (by weight); granular structure; slightly hard, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-2

3 to 10 inches—extremely gravelly loam, extremely gravelly clay loam; 10 to 20 percent cobbles and stones and 65 to 80 percent pebbles (by weight); hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2

10 inches—unweathered bedrock

*Range in depth to bedrock:* 8 to 14 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None  
*Permeability:* Moderate  
*Available water capacity:* 0.5 inch  
*Water supplying capacity:* .5 inches  
*Runoff:* Rapid  
*Hydrologic group:* D  
*Erosion factors (upper layer):* K value—.010; T value—.1  
 wind erodibility group—B  
*Hazard of erosion:* By water—moderate; by wind—slight  
*Shrink-swell potential:* Low  
*Corrosivity:* To steel—moderate; to concrete—low  
*Potential frost action:* Moderate

#### Contrasting Inclusions

- Inclusion 1:* Position on landscape—concave back slopes of hills and mountains, contrasting features—moderately deep and deep, loamy; distinctive present vegetation—Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass  
*Inclusion 2:* Position on landscape—concave, south- and west-facing back slopes of hills and mountains, contrasting feature—lower water supplying capacity, distinctive present vegetation—desert needlegrass, tileleaf horsebrush, Indian ricegrass, shadscale  
*Inclusion 3:* Position on landscape—drainageways of hills and mountains; contrasting feature—bedrock at a depth of more than 60 inches; distinctive present vegetation—Wyoming big sagebrush, spiny hopsage, Indian ricegrass

#### Major Uses

Range and wildlife habitat

#### Potential Native Plant Community (Table 44)

##### Elements of Wildlife Habitat

- Suitability of Loomer soil for named elements:*  
 Wild herbaceous plants (nonirrigated)—poor  
 Shrubs (nonirrigated)—poor  
*Suitability of Zephaniah soil for named elements:*  
 Wild herbaceous plants (nonirrigated)—fair  
 Shrubs (nonirrigated)—fair  
*Suitability of Olac soil for named elements:*  
 Wild herbaceous plants (nonirrigated)—poor  
 Shrubs (nonirrigated)—poor

##### Ratings for Selected Uses

- (Loomer Soil)*  
*Suitability and limitation for the following use—*  
 Range and seeding: Poor—large stones  
*(Zephaniah Soil)*  
*Suitability and limitation for the following use—*  
 Range and seeding: Poor—large stones  
*(Olac Soil)*  
*Suitability and limitations for the following use—*  
 Range and seeding: Poor—droughty, large stones

#### Interpretive Groups

- Capability classification:* Loomer soil—V1s, nonirrigated  
 Zephaniah soil—V1s, nonirrigated, Olac soil—V1s  
 nonirrigated  
*Range site symbol:* Loomer soil—026X025N, Zephaniah soil—026X025N, Olac soil—026X025N

#### 553—Fulstone cobbly loam, 4 to 30 percent slopes

##### Map Unit Setting

- Position on landscape:* Alluvial fans  
*Elevation:* 5,000 to 5,500 feet  
*Climatic data (average annual):*  
 Precipitation—about 9 inches  
 Air temperature—about 50 degrees F  
 Frost-free season—about 120 days

##### Composition

*Fulstone cobbly loam, 4 to 30 percent slopes (Abruptic Xerollic Durargids - clayey, montmorillonitic, mesic shallow)*

*Contrasting inclusions as follows—*

- Inclusion 1:* Reno cobbly sandy loam (Abruptic Xerollic Durargids - fine montmorillonitic, mesic)—5 percent  
*Inclusion 2:* Hunewill very gravelly sandy loam (Xerollic Hapargids - loamy-skeletal mixed, mesic)—3 percent  
*Inclusion 3:* Veta very gravelly sandy loam (Xerollic Camborthids - loamy-skeletal, mixed, mesic)—2 percent

##### Fulstone Soil

- Position on landscape:* Alluvial fans  
*Parent material:* Kind—alluvium; source—volcanic rock  
*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush, squirreltail  
*Rock fragments on surface:* Kind—gravel, cobbles, percentage of surface covered—90  
*Typical profile:*  
 0 to 5 inches—cobbly loam; 15 to 30 percent cobbles and 25 to 35 percent pebbles (by weight), subangular blocky structure; slightly hard, very friable; neutral (pH 6.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM-GC, SM-SC; estimated AASHTO classification—A-4  
 5 to 18 inches—clay; 0 to 5 percent cobbles and 0 to 10 percent pebbles (by weight), prismatic structure; very hard, firm; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

18 to 55 inches or more—indurated hardpan  
*Range in depth to hardpan:* 14 to 20 inches  
*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Slow

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.28; T value—1  
 wind erodibility group—7

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—fan skirts below alluvial fans contrasting feature—hardpan at a depth of 20 to 40 inches; distinctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Inclusion 2:* Position on landscape—inset fans, contrasting features—no hardpan, no claypan; distinctive present vegetation—Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass

*Inclusion 3:* Position on landscape—drainageways, contrasting feature—very gravelly sandy loam throughout the profile; distinctive present vegetation—Wyoming big sagebrush, spiny hopsage and an ricegrass

#### **Major Uses**

Rangeland wildlife habitat

#### **Potential Native Plant Community (Table 45)**

#### **Elements of Wildlife Habitat**

*Suitability for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

*Suitability and limitations for the following use—*

Range and seeding: Poor—large stones, droughty

#### **Interpretive Groups**

*Capability classification:* Vlls. nonirrigated

*Range site symbol:* Q26X025N

554—Fulstone-Reno association

#### **Map Unit Setting**

*Position on landscape:* Alluvial fans

*Elevation:* 5,000 to 5,400 feet

*Climatic data (average annual)*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 110 days

#### **Composition**

*Fulstone cobbly loam, 4 to 30 percent slopes (Abruptic Xerollic Durargids - clayey, montmorillonitic, mesic, shallow)—55 percent*

*Reno cobbly sandy loam, 4 to 15 percent slopes (Abruptic Xerollic Durargids - fine, montmorillonitic, mesic)—30 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Huxwell very gravelly sandy loam (Xerollic Haplargids - loamy-skeletal, mixed mesic)—10 percent

*Inclusion 2:* Veta very gravelly sandy loam (Xerollic Camborthids - loamy-skeletal, mixed, mesic)—5 percent

#### *Fulstone Soil*

*Position on landscape:* Alluvial fans

*Parent material:* Kind—alluvium, source—volcanic rock

*Dominant present vegetation:* Low sagebrush Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, percentage of surface covered—90

*Typical profile*

0 to 5 inches—cobbly loam, 15 to 30 percent cobbles and 25 to 35 percent pebbles (by weight); subangular blocky structure; slightly hard very friable; neutral (pH 8.8); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—GM-GC SM-SC, estimated AASHTO classification—A-4

5 to 18 inches—clay, 0 to 5 percent cobbles and 0 to 10 percent pebbles (by weight); prismatic structure; very hard, firm; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH, MH, estimated AASHTO classification—A-7

18 to 55 inches or more—indurated hardpan

*Range in depth to hardpan:* 14 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Slow

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.28; T value—1 wind erodibility group—7

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high to concrete—low

*Potential frost action:* Moderate

#### *Reno Soil*

*Position on landscape:* Upper part of alluvial fans and fan remnants

*Parent material:* Kind—alluvium; source—various kinds of rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles; percentage of surface covered—80

*Typical profile:*

0 to 7 inches—cobbley sandy loam, 15 to 30 percent cobbles and 10 to 35 percent pebbles (by weight); platy structure; hard, very friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3), estimated Unified classification—SM; estimated AASHTO classification—A-1, A-2

7 to 23 inches—clay, gravelly clay, sandy clay; 0 to 5 percent cobbles and 5 to 30 percent pebbles (by weight); prismatic structure; very hard, very firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13), estimated Unified classification—CL, SC, CH, estimated AASHTO classification—A-7

23 to 50 inches or more—indurated hardpan

*Range in depth to hardpan:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Very slow

*Available water capacity:* 4 inches

*Water supplying capacity:* 10 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—2 wind erodibility group—4

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—swales, inset fans, contrasting features—no hardpan, clayey, distinctive present vegetation—Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass

*Inclusion 2:* Position on landscape—drainageways, contrasting feature—gravelly and very gravelly sandy loam and loamy sand throughout the profile,

distinctive present vegetation—Wyoming big sagebrush, spiny hopsage, Indian ricegrass

#### **Major Uses**

*Current uses:* Rangeland, wildlife habitat

*Potential foreseeable use:* Homesites

#### **Potential Native Plant Community (Table 46)**

#### **Elements of Wildlife Habitat**

*Suitability of Fulstone soil for named elements*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Reno soil for named elements*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

#### **Ratings for Selected Uses**

*(Fulstone Soil)*

*Suitability and limitations for the following uses—*

Rangeland seeding: Poor—rooting depth droughty

Shallow excavations: Severe—cemented pan slope

Local roads and streets: Severe—cemented pan slope

*(Reno Soil)*

*Suitability and limitations for the following uses—*

Rangeland seeding: Poor—rooting depth droughty

Shallow excavations: Severe—cemented pan

Local roads and streets: Severe—low strength shrink-swell

#### **Interpretive Groups**

*Capability classification:* Fulstone soil—V1s nonirrigated; Reno soil—V1s, nonirrigated

*Range site symbol:* Fulstone soil—026X025N, Reno soil—026X025N

**571—Ackley gravelly sandy loam, 2 to 4 percent slopes**

#### **Map Unit Setting**

*Position on landscape:* Alluvial fans

*Elevation:* 4,300 to 4,500 feet

*Climatic data (average annual):*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

#### **Composition**

*Ackley gravelly sandy loam, 2 to 4 percent slopes*

(Xerollic Haplargids fine-loamy, mixed, mesic)

*Contrasting inclusions as follows—*

*Inclusion 1:* Reno cobbly sandy loam (Abruptic Xerollic Durargids - fine, montmorillonitic, mesic)—6 percent

*Inclusion 2:* Veta very gravelly sandy loam (Xerollic Hap argids - loamy-skeletal, mixed, mesic)—4 percent

#### *Ackley Soil*

*Position on landscape:* Alluvial fans

*Parent material:* Kind—alluvium; source—various kinds of rock

*Dominant present vegetation:* Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—35

*Typical profile:*

0 to 3 inches—gravelly sandy loam; 25 to 40 percent pebbles (by weight); platy structure; slightly hard, very friable, neutral (pH 6.8); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SM, estimated AASHTO classification—A-1, A-2

3 to 27 inches—sandy loam, loam; 0 to 25 percent pebbles (by weight); subangular blocky structure; hard, friable, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—CL-ML, ML, estimated AASHTO classification—A-4

27 to 60 inches or more—fine sandy loam; 0 to 20 percent pebbles (by weight); massive; slightly hard, friable; neutral (pH 7.2); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13); estimated Unified classification—SM, estimated AASHTO classification—A-2, A-4

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 7 inches

*Water supplying capacity:* 9 inches

*Runoff:* Slow

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.15; T value—5; wind erodibility group—4

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—fan remnants; contrasting features—layer of clay accumulation, indurated hardpan at a depth of 20 to 40 inches, distinctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Inclusion 2:* Position on landscape—drainageways; contrasting feature—very gravelly sandy loam and extremely gravelly loamy sand throughout the profile; distinctive present vegetation—Wyoming big sagebrush, spiny hopsage, Indian ricegrass

#### **Major Uses**

*Current uses:* Rangeland, wildlife habitat

*Potential foreseeable use:* Homesites

#### **Potential Native Plant Community (Table 47)**

#### **Elements of Wildlife Habitat**

*Suitability for named elements:*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

#### **Ratings for Selected Uses**

*Suitability and limitations for the following uses—*

Rangeland seeding: Fair—droughty

Shallow excavations: Slight

Local roads and streets: Moderate—frost action, shrink-swell

#### **Interpretive Groups**

*Capability classification:* Vic, nonirrigated & irrigated

*Range site symbol:* 026X016N

### **572—Ackley-Veta complex, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Position on landscape:* Alluvial fans

*Elevation:* 4,400 to 4,600 feet

*Climatic data (average annual)*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 120 days

#### **Composition**

*Ackley gravelly sandy loam, 2 to 4 percent slopes*

(Xerollic Haplargids - fine-loamy, mixed, mesic)—50 percent

*Veta very gravelly sandy loam, 2 to 8 percent slopes*

(Xerollic Camborthids - loamy-skeletal, mixed, mesic)—40 percent

*Contrasting inclusion as follows—*

*Inclusion 1:* Reno gravelly sandy loam (Abruptic Xerollic Durargids - fine, montmorillonitic, mesic)—10 percent

#### *Ackley Soil*

*Position on landscape:* Toe slopes of alluvial fans

*Parent material:* Kind—alluvium; source—various kinds of rock

**Dominant present vegetation:** Wyoming big sagebrush, Anderson peachbrush, Thurber needlegrass

**Rock fragments on surface:** Kind—gravel; percentage of surface covered—35

**Typical profile:**

0 to 10 inches—gravelly sandy loam; 25 to 40 percent pebbles (by weight); platy structure; slightly hard, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-1, A-2

10 to 34 inches—sandy loam, loam; 0 to 25 percent pebbles (by weight); subangular blocky structure; hard friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 6); estimated Unified classification—CL-ML, ML; estimated AASHTO classification—A-4

34 to 60 inches or more—fine sandy loam, 0 to 20 percent pebbles (by weight); massive; slightly hard, friable; neutral (pH 7.2); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—SM; estimated AASHTO classification—A-2, A-4

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderate

**Available water capacity:** 7 inches

**Water supplying capacity:** 9 inches

**Runoff:** Slow

**Hydrologic group:** B

**Erosion factors (upper layer):** K value—0.15; T value—5; wind erodibility group—4

**Hazard of erosion:** By water—slight; by wind—slight

**Shrink-swell potential:** Moderate

**Corrosivity:** To steel—high, to concrete—low

**Potential frost action:** Moderate

**Veta Soil**

**Position on landscape:** Inset fans

**Parent material:** Kind—alluvium; source—various kinds of rock

**Dominant present vegetation:** Wyoming big sagebrush, spiny hopsage, Indian ricegrass

**Rock fragments on surface:** Kind—gravel; percentage of surface covered—85

**Typical profile:**

0 to 6 inches—very gravelly sandy loam; 0 to 25 percent cobbles and 50 to 65 percent pebbles (by weight); platy structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-1

6 to 18 inches—extremely gravelly loam, very gravelly sandy loam, very gravelly loam; 10 to 30

percent cobbles and 50 to 70 percent pebbles (by weight); subangular blocky structure; slightly hard, very friable; neutral (pH 7.2); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—GM; estimated AASHTO classification—A-1, A-2

18 to 60 inches or more—stratified extremely gravelly loamy sand to very gravelly loam; 10 to 25 percent cobbles and stones and 50 to 80 percent pebbles (by weight); massive; slightly hard, very friable; moderately alkaline (pH 8.2); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GP-GM, GM; estimated AASHTO classification—A-1

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately rapid

**Available water capacity:** 3.5 inches

**Water supplying capacity:** 7.5 inches

**Runoff:** Medium

**Hydrologic group:** B

**Erosion factors (upper layer):** K value—0.10; T value—5; wind erodibility group—8

**Hazard of erosion:** By water—slight, by wind—slight

**Shrink-swell potential:** Low

**Corrosivity:** To steel—high to concrete—low

**Potential frost action:** Moderate

**Contrasting Inclusion**

**Inclusion 1:** Position on landscape—fan remnants; contrasting features—layer of clay accumulation; hardpan at a depth of 20 to 40 inches; disjunctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush squirreltail

**Major Uses**

**Current uses:** Rangeland, wildlife habitat

**Potential foreseeable use:** Homesites

**Potential Native Plant Community (Table 4B)**

**Elements of Wildlife Habitat**

**Suitability of Ackley soil for named elements**

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

**Suitability of Veta soil for named elements**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Ratings for Selected Uses**

**(Ackley Soil)**

**Suitability and limitations for the following uses—**

Rangeland seeding: Fair—too and

Shallow excavations: Slight

Local roads and streets: Moderate—frost action, shrink-swell

*(Veta Soil)*

*Suitability and limitations for the following uses:*

Range and seeding: Poor—small stones

Shallow excavations: Severe—cutbanks cave

Local roads and streets: Moderate—frost action, large stones

**Interpretive Groups**

*Capability classification:* Ackley soil—Vic, nonirrigated, Veta soil—V1s, nonirrigated

*Range site symbol:* Ackley soil—026X016N; Veta soil—026X024N

**602—Pits-Dumps complex**

*Kind of areas:* Mines, quarries, borrow pits, spoil dumps

*Kind of material:* Broken rock, excavated alluvial deposits

*Dominant present vegetation:* Mostly barren

**675—Xman-Zephan-Mizel association**

**Map Unit Setting**

*Position on landscape:* Hills, mountains

*Elevation:* 5,000 to 6,000 feet

*Climatic data (average annual):*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 100 days

**Composition**

*Xman very stony loam, 15 to 50 percent slopes (Xerollic Haplargids - clayey, montmorillonitic, mesic, shallow)—35 percent*

*Zephan stony sandy loam, 15 to 50 percent slopes (Xerollic Haplargids - clayey-skeletal, montmorillonitic, mesic)—25 percent*

*Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes (Lithic Torriorthents - loamy-skeletal, mixed, nonacid, mesic)—25 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Raywat stony loam (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—6 percent

*Inclusion 2:* Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—4 percent

*Inclusion 3:* Xerollic Haplargids (Xerollic Haplargids - loamy-skeletal, mixed, mesic)—3 percent

*Inclusion 4:* Rock outcrop—2 percent

**Xman Soil**

*Position on landscape:* Back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—85

*Typical profile*

0 to 2 inches—very stony loam, 20 to 50 percent cobbles and stones and 25 to 35 percent pebbles (by weight), platy structure; slightly hard, friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SM, estimated AASHTO classification—A-2, A-4

2 to 14 inches—clay, gravelly clay; 0 to 10 percent cobbles and stones and 0 to 30 percent pebbles (by weight), prismatic structure; hard, firm, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—CH, estimated AASHTO classification—A-7

14 to 29 inches—weathered bedrock

29 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.32; T value—1, wind erodibility group—B

*Hazard of erosion:* By water—moderate, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Low

**Zephan Soil**

*Position on landscape:* Back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—andesite

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile:*

0 to 3 inches—stony sandy loam; 5 to 10 percent cobbles and stones and 45 to 55 percent pebbles (by weight), platy structure; slightly hard, very



friable, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM-SC, estimated AASHTO classification—A-2

3 to 31 inches—very cobbly clay; 30 to 40 percent cobbles and stones and 30 to 40 percent pebbles (by weight) subangular blocky structure, hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, CH; estimated AASHTO classification—A-7

31 to 41 inches—weathered bedrock

41 inches—unweathered bedrock

*Range in depth to bedrock:* 25 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 4 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.15; T value—2; wind erodibility group—4

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—moderate

*Potential frost action:* Low

#### Mizel Soil

*Position on landscape:* Erosional shoulders and back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, bottlebrush squirrel tail

*Rock fragments on surface:* Kind—gravel, percentage of surface covered—70

*Typical profile:*

0 to 8 inches—very gravelly coarse sandy loam, 5 to 10 percent cobbles and stones and 60 to 70 percent pebbles (by weight), massive; soft, very friable; slightly acid (pH 6.1); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM, estimated AASHTO classification—A-1

8 inches—unweathered bedrock

*Range in depth to bedrock:* 3 to 10 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* Less than 0.5 inch

*Water supplying capacity:* 4 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—1; wind erodibility group—5

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—moderate; to concrete—moderate

*Potential frost action:* Moderate

#### Contrasting Inclusions

*Inclusion 1:* Position on landscape—concave, north- and east-facing back slopes of hills and mountains; contrasting features—thick dark-colored upper layer, receives additional moisture from runoff; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 2:* Position on landscape—convex back slopes and shoulders of hills and mountains; contrasting feature—22 to 35 percent clay between a depth of 6 inches and bedrock; distinctive present vegetation—Wyoming big sagebrush, green ephedra, antelope bitterbrush

*Inclusion 3:* Position on landscape—south-facing back slopes of hills and mountains; contrasting features—very cobbly, 18 to 27 percent clay; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 4:* Position on landscape—ridges and back slopes of hills and mountains; contrasting features—bedrock exposed at the surface; distinctive present vegetation—barren

#### Major Uses

Rangeland, wildlife habitat

#### Potential Native Plant Community (Table 49)

#### Elements of Wildlife Habitat

*Suitability of Xman soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Zephan soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Mizel soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### Ratings for Selected Uses

*(Xman Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, droughty; erodes easily

*(Zephan Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Poor—small stones

*(Mizel Soil)*

*Suitability and limitations for the following use—*

Range and seeding. Poor—droughty, depth to rock, small stones

**Interpretive Groups**

*Capability classification:* Xman soil—VIIIs, nonirrigated; Zephan soil—VIs, nonirrigated; Mizel soil—VIIIs, nonirrigated

*Range site symbol:* Xman soil—026X025N; Zephan soil—026X017N; Mize soil—026X050N

**876—Xman-Opbio-Old Camp association****Map Unit Setting**

*Position on landscape:* Hills, mountains

*Elevation:* 4,500 to 5,200 feet

*Climatic data (average annual):*

Precipitation—about 10 inches

Air temperature—about 50 degrees F

Frost-free season—about 100 days

**Composition**

*Xman very stony loam, 15 to 50 percent slopes (Xerollic Haplargids - clayey, montmorillonitic, mesic, shallow)—35 percent*

*Opbio very stony fine sandy loam, 15 to 50 percent slopes (Xerollic Haplargids - fine, montmorillonitic, mesic)—30 percent*

*Old Camp extremely stony sandy loam, 30 to 50 percent slopes (Lithic Xerollic Haplargids - loamy-skeletal mixed, mesic)—20 percent*

*Contrasting inclusions as follows—*

*inclusion 1:* Mizel very gravelly coarse sandy loam (Lithic Torriorthents - loamy-skeletal, mixed, nonacid, mesic)—5 percent

*inclusion 2:* Xerollic Haplargids (Xerollic Haplargids - loamy, mixed, mesic, shallow)—4 percent

*inclusion 3:* Rock outcrop—4 percent

*inclusion 4:* Reywat stony loam (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—2 percent

*Xman Soil*

*Position on landscape:* Shoulders and back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—85

*Typical profile:*

0 to 2 inches—very stony loam; 20 to 50 percent cobbles and stones and 25 to 35 percent pebbles (by weight); platy structure; slightly hard, friable;

neutral (pH 6.8), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-2, A-4

2 to 14 inches—gravelly clay, clay; 0 to 10 percent cobbles and stones and 0 to 30 percent pebbles (by weight); prismatic structure; hard, firm; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CH; estimated AASHTO classification—A-7

14 to 29 inches—weathered bedrock

29 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.32; T value—1, wind erodibility group—8

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

*Opbio Soil*

*Position on landscape:* Back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—andesite

*Dominant present vegetation:* Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—90

*Typical profile:*

0 to 6 inches—very stony fine sandy loam, 25 to 35 percent cobbles and stones and 35 to 55 percent pebbles (by weight); platy structure; hard, friable, mildly alkaline (pH 7.6), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13); estimated Unified classification—SM; estimated AASHTO classification—A-1, A-2

6 to 27 inches—gravelly clay, 0 to 5 percent cobbles and stones and 40 to 50 percent pebbles (by weight); prismatic structure; extremely hard, very firm; mildly alkaline (pH 7.6), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13); estimated Unified classification—GC; estimated AASHTO classification—A-7

27 inches or more—unweathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 3.5 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.28; T value—2, wind erodibility group—B

*Hazard of erosion:* By water—severe, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high; to concrete—moderate

*Potential frost action:* Moderate

#### *Old Camp Soil*

*Position on landscape:* Back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—90

*Typical profile:*

0 to 2 inches—extremely stony sandy loam; 25 to 55 percent cobbles and stones and 35 to 45 percent pebbles (by weight), granular structure, soft, very friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM, estimated AASHTO classification—A-1

2 to 14 inches—very cobbly clay loam, extremely stony sandy clay loam; 35 to 50 percent cobbles and stones and 50 to 65 percent pebbles (by weight), subangular blocky structure; hard, firm, moderately alkaline (pH 8.2), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8), estimated Unified classification—GC, estimated AASHTO classification—A-2, A-6

14 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1.5 inches

*Water supplying capacity:* 5 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—1, wind erodibility group—B

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—convex erosional back slopes of hills and mountains; contrasting features—layer of clay accumulation, bedrock at a depth of less than 10 inches, distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 2:* Position on landscape—south-facing back slopes of hills and mountains; contrasting feature—lower water supplying capacity, distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 3:* Position on landscape—ridges and back slopes of hills and mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

*Inclusion 4:* Position on landscape—concave, north- and east-facing back slopes of hills and mountains; contrasting features—higher water supplying capacity, receives additional moisture from runoff; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

#### *Major Uses*

Rangeland, wildlife habitat

#### *Potential Native Plant Community (Table 50)*

#### *Elements of Wildlife Habitat*

*Suitability of Xman soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Oppio soil for named elements*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Old Camp soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### *Ratings for Selected Uses*

*(Xman Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, droughty, erodes easily

*(Oppio Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, erodes easily

*(Old Camp Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, droughty

## Interpretive Groups

*Capability classification.* Xman soil—Vlls, nonirrigated;  
Oppio soil—Vlls, nonirrigated; Old Camp soil—Vlls,  
nonirrigated

*Range site symbol.* Xman soil—026X025N, Oppio  
soil—026X025N; Old Camp soil—026X022N

## 877--Xman-Duco association

### Map Unit Setting

*Position on landscape.* Hills, mountains

*Elevation.* 5,200 to 5,800 feet

*Climatic data (average annual).*

Precipitation—about 10 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

### Composition

*Xman very stony loam, 30 to 50 percent slopes (Xerollic  
Haplargids - clayey, montmorillonitic, mesic)—50  
percent*

*Duco very stony sandy loam, 30 to 50 percent slopes  
(Lithic Argixerolls - loamy-skeletal, mixed, mesic)—  
35 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Smallcone very gravelly coarse sandy  
loam (Lithic Xeric Torriorthents - loamy-skeletal,  
mixed, nonacid, mesic)—10 percent

*Inclusion 2:* Rock outcrop—5 percent

### Xman Soil

*Position on landscape.* South- and west-facing back  
slopes of hills and mountains

*Parent material.* Kind—residuum, colluvium; source—  
volcanic rock

*Dominant present vegetation.* Low sagebrush, Thurber  
need grass, bottlebrush, squirreltail

*Rock fragments on surface.* Kind—gravel, cobbles,  
stones, percentage of surface covered—85

*Typical profile*

0 to 5 inches—very stony loam; 20 to 50 percent  
cobbles and stones and 25 to 35 percent pebbles  
(by weight); platy structure; slightly hard, very  
friable, neutral (pH 6.8), nonsaline (less than 2  
mmhos/cm); nonsodic (SAR of less than 3);  
estimated Unified classification—SM; estimated  
AASHTO classification—A-2, A-4

5 to 18 inches—gravelly clay, clay, 0 to 10 percent  
cobbles and stones and 0 to 30 percent pebbles  
(by weight); prismatic structure; hard, firm; neutral  
(pH 7.0), nonsaline (less than 2 mmhos/cm);  
nonsodic (SAR of less than 3); estimated Unified  
classification—CH; estimated AASHTO  
classification—A-7

18 to 35 inches—weathered bedrock

35 inches—unweathered bedrock

*Range in depth to bedrock.* 10 to 20 inches

*Depth to seasonal high water table.* More than 60  
inches

*Hazard of flooding.* None

*Permeability.* Slow

*Available water capacity.* 2 inches

*Water supplying capacity.* 7 inches

*Runoff.* Rapid

*Hydrologic group.* D

*Erosion factors (upper layer).* K value—0.32, T value—  
1; wind erodibility group—8

*Hazard of erosion.* By water—moderate, by wind—  
slight

*Shrink-swell potential.* High

*Corrosivity.* To steel—moderate to concrete—low

*Potential frost action.* Low

### Duco Soil

*Position on landscape.* North- and east-facing back  
slopes of hills and mountains

*Parent material.* Kind—colluvium, residuum; source—  
andesite

*Dominant present vegetation.* Singleleaf pinyon, Utah  
juniper

*Rock fragments on surface.* Kind—gravel, cobbles,  
stones, percentage of surface covered—90

*Typical profile*

0 to 5 inches—very stony sandy loam; 25 to 35  
percent cobbles and stones and 25 to 50 percent  
pebbles (by weight); platy structure; soft, very  
friable, neutral (pH 6.8), nonsaline (less than 2  
mmhos/cm), nonsodic (SAR of less than 13);  
estimated Unified classification—SM-SC, GM-GC;  
estimated AASHTO classification—A-2

5 to 18 inches—very cobbly sandy clay loam, very  
gravelly clay loam; 15 to 55 percent cobbles and  
stones and 45 to 70 percent pebbles (by weight);  
subangular blocky structure; hard, firm; neutral  
(pH 7.0), nonsaline (less than 2 mmhos/cm);  
nonsodic (SAR of less than 13); estimated  
Unified classification—GC; estimated AASHTO  
classification—A-2

19 inches—unweathered bedrock

*Range in depth to bedrock.* 10 to 20 inches

*Depth to seasonal high water table.* More than 60  
inches

*Hazard of flooding.* None

*Permeability.* Moderately slow

*Available water capacity.* 1 inch

*Water supplying capacity.* 7 inches

*Runoff.* Rapid

*Hydrologic group.* D

*Erosion factors (upper layer).* K value—0.17, T value—  
1; wind erodibility group—5

*Hazard of erosion.* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—back slopes of hills and mountains, contrasting feature—no layer of clay accumulation; distinctive present vegetation—ponderosa pine

*Inclusion 2:* Position on landscape—ridges and back slopes of hills and mountains, contrasting feature—bedrock exposed at the surface, distinctive present vegetation—barren

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 51)**

##### **Woodland**

*(Ducco Soil)*

*Site index for common trees:* Singleleaf pinyon—35, Utah juniper—35

*Most important native understory plants:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

#### **Elements of Wildlife Habitat**

*Suitability of Xman soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Ducco soil for named elements*

Wild herbaceous plants (nonirrigated)—poor

Coniferous plants (nonirrigated)—very poor

Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

*(Xman Soil)*

*Suitability and limitations for the following use—*

Range and seeding: Poor—large stones, droughty, erodes easily

*(Ducco Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, droughty

#### **Interpretive Groups**

*Capability classification:* Xman soil—VIIa, nonirrigated;

Ducco soil—VI s, nonirrigated

*Range site symbol:* Xman soil—026X025N

*Woodland suitability group:* Ducco soil—1r

#### **893—Indiano-Ducco-Cagle association**

#### **Map Unit Setting**

*Position on landscape:* Hills, mountains

*Elevation:* 5,200 to 6,300 feet

*Climatic data (average annual)*

Precipitation—about 12 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

#### **Composition**

*Indiano stony fine sandy loam, 15 to 30 percent slopes (Andic Argixerolls - fine-loamy, mixed, mesic)—35 percent*

*Ducco very stony sandy loam, 30 to 75 percent slopes (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—30 percent*

*Cagle very stony clay loam, 15 to 30 percent slopes (Andic Argixerolls - fine, montmorillonitic, mesic)—20 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—5 percent

*Inclusion 2:* Wedekind gravelly loam (Andic Argixerolls - loamy, mixed, mesic, shallow)—4 percent

*Inclusion 3:* Manogue cobbly clay (Entic Chromoxerents - fine, montmorillonitic, mesic)—3 percent

*Inclusion 4:* Nostrac stony clay loam (Andic Argixerolls - loamy-skeletal, mixed, mesic)—3 percent

#### *Indiano Soil*

*Position on landscape:* Back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—andesite

*Dominant present vegetation:* Wyoming big sagebrush, Thurber needlegrass, antelope bitterbrush

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—80

*Typical profile:*

0 to 13 inches—stony fine sandy loam, 20 to 25 percent cobbles and stones and 20 to 35 percent pebbles (by weight), subangular blocky structure, soft, very friable, neutral (pH 7.0), nonsaline, less than 2 mmhos/cm, nonsodic (SAR of less than 3); estimated Unified classification—SM, estimated AASHTO classification—A-2, A-4

13 to 33 inches—gravelly clay loam, clay loam, 0 to 15 percent cobbles and 15 to 40 percent pebbles (by weight), subangular blocky structure, hard, friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, GC, estimated AASHTO classification—A-2, A-6, A-7

33 inches—unweathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 5 inches

*Water supplying capacity:* 11 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.32; T value—2; wind erodibility group—4

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### *Duco Soil*

*Position on landscape:* Shoulders and upper side slopes of hills and mountains

*Parent material:* Kind—colluvium, residuum, andesite

*Dominant present vegetation:* Singleleaf pinyon, Utah juniper

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile:*

0 to 5 inches—very stony sandy loam; 25 to 35 percent cobbles and stones and 25 to 50 percent pebbles (by weight); platy structure; soft, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM-SC, GM-GC; estimated AASHTO classification—A-2

5 to 19 inches—very cobbly sandy clay loam, very gravelly clay loam; 15 to 55 percent cobbles and stones and 45 to 70 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—GC; estimated AASHTO classification—A-2

19 inches—unweathered bedrock

*Range in depth to bedrock:* 10 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1 inch

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17; T value—1; wind erodibility group—5

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

#### *Cagle Soil*

*Position on landscape:* Back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Singleleaf pinyon, Utah juniper

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—85

*Typical profile:*

0 to 4 inches—very stony clay loam; 25 to 35 percent cobbles and stones and 10 to 20 percent pebbles (by weight); granular structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CL; estimated AASHTO classification—A-6, A-7

4 to 24 inches—gravelly clay, gravelly clay loam; 0 to 5 percent cobbles and stones and 25 to 50 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CL, CH, GC; estimated AASHTO classification—A-7

24 inches—weathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 3.5 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.28; T value—2; wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Low

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—south-facing ridges on hill and mountains; contrasting feature—lower water supplying capacity; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

*Inclusion 2:* Position on landscape—slightly convex back slopes of hills and mountains; contrasting feature—less than 35 percent gravel throughout the profile; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 3:* Position on landscape—pediments of hills and mountains; contrasting feature—clay or silty clay

throughout the profile distinctive present vegetation—Wyoming big sagebrush, littleleaf horsebrush

*Inclusion 4:* Position on landscape—concave, north- and east-facing back slopes of hills and mountains, contrasting features—bedrock at a depth of more than 40 inches, receives additional moisture from runoff, lower water supplying capacity, distinctive present vegetation—mountain big sagebrush, antelope bitterbrush, western needlegrass

*Inclusion of minor extent:* Position on landscape—ridges and back slopes of hills and mountains, contrasting feature—bedrock exposed at the surface, distinctive present vegetation—barren

### Major Uses

Range and wildlife habitat, woodland

### Potential Native Plant Community (Table 52)

#### Wood and

(*Duco Soil*)

*Site index for common trees.* Singleleaf pinyon—35, Utah juniper—35

*Most important native understory plants:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

(*Cagle Soil*)

*Site index for common trees.* Singleleaf pinyon—35, Utah juniper—35

*Most important native understory plants.* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

### Elements of Wildlife Habitat

*Suitability of Indiano soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Duco soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Coniferous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Cagle soil for named elements.*

Wild herbaceous plants (nonirrigated)—fair

Coniferous plants (nonirrigated)—poor

Shrubs (nonirrigated)—fair

### Ratings for Selected Uses

(*Indiano Soil*)

*Suitability and limitations for the following use—*

Range and seeding: Poor—large stones, erodes easily

(*Duco Soil*)

*Suitability and limitations for the following use—*

Range and seeding: Poor—large stones, erodes easily, droughty

(*Cagle Soil*)

*Suitability and limitation for the following use:*

Range and seeding: Poor—large stones

### Interpretive Groups

*Capability classification:* Indiano soil—VIs, nonirrigated; Duco soil—VIIIs, nonirrigated; Cagle soil—VI s, nonirrigated

*Range site symbol:* Indiano soil—026X010N

*Woodland suitability group:* Duco soil—1r, Cagle soil—1r

### 894—Indiano-Devada association

### Map Unit Setting

*Position on landscape.* Hills, mountains

*Elevation.* 5,800 to 6,800 feet

*Climatic data (average annual)*

Precipitation—about 11 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

### Composition

*Indiano stony sandy loam, 30 to 50 percent slopes (Andic Argixerolls - fine-loamy mixed, mesic)—55 percent*

*Devada very cobbly loam, 8 to 15 percent slopes (Lithic Argixerolls - clayey, montmorillonitic, mesic)—35 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Lithic Xeric Torriorthents (Lithic Xeric Torriorthents - loamy-skeletal, mixed, mesic)—7 percent

*Inclusion 2:* Rock outcrop—3 percent

#### Indiano Soil

*Position on landscape.* Back slopes of hills and mountains

*Parent material:* Kind—colluvium, residuum; source—andesite

*Dominant present vegetation.* Wyoming big sagebrush, Thurber needlegrass, antelope bitterbrush

*Rock fragments on surface.* Kind—gravel, stones, percentage of surface covered—80

*Typical profile:*

0 to 13 inches—stony sandy loam, 20 to 25 percent cobbles and stones and 20 to 35 percent pebbles (by weight), subangular blocky structure, soft, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13) estimated Unified classification—SM, estimated AASHTO classification—A-1, A-2

13 to 36 inches—clay loam, gravelly clay loam, sandy clay loam, 0 to 15 percent cobbles and stones and 15 to 40 percent pebbles (by weight), subangular blocky structure, hard, friable, neutral

(pH 7.0), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, GC; estimated AASHTO classification—A-2, A-6, A-7

36 inches—unweathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 5 inches

*Water supplying capacity:* 11 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.32; T value—2, wind erodibility group—4

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Moderate

#### *Devada Soil*

*Position on landscape:* Back slopes and ridges of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—andesite

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles; percentage of surface covered—80

*Typical profile*

0 to 4 inches—very cobbly loam, 30 to 65 percent cobbles and 30 to 50 percent pebbles (by weight); granular structure; slightly hard, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, SC, GM-GC, SM-SC; estimated AASHTO classification—A-2, A-4, A-6

4 to 13 inches—gravelly clay, clay; 0 to 5 percent cobbles and 0 to 45 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH, GC; estimated AASHTO classification—A-7

13 inches—unweathered bedrock

*Range in depth to bedrock:* 12 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2 inches

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.15; T value—1, wind erodibility group—8

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Low

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—ridges and shoulders of hills and mountains; contrasting features—severely eroded areas; lower water supplying capacity; distinctive present vegetation—low sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 2:* Position on landscape—ridges and back slopes of hills and mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 53)**

#### **Elements of Wildlife Habitat**

*Suitability of Indiano soil for named elements:*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Devada soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

*(Indiano Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones erode easily

*(Devada Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, droughty

#### **Interpretive Groups**

*Capability classification:* Indiano soil—VI s, nonirrigated

Devada soil—VII s, nonirrigated

*Range site symbol:* Indiano soil—026X010N, Devada soil—026X023N

#### **1010—Teguro-Indiano-Oprio association**

#### **Map Unit Setting**

*Position on landscape:* Hills, mountains

*Elevation:* 5,800 to 7,000 feet

*Climatic data (average annual)*



Precipitation—about 12 inches  
 Air temperature—about 46 degrees F  
 Frost-free season—about 100 days

### Composition

*Teguro* gravelly loam, 4 to 30 percent slopes (Lithic Argixerolls - loamy, mixed, frigid)—40 percent  
*Indiana* stony fine sandy loam, 30 to 50 percent slopes (Aridic Argixerolls - fine-loamy, mixed, mesic)—30 percent

*Opio* very cobbly loam, 8 to 15 percent slopes (Xerollic Haplargids - fine, montmorillonitic, mesic)—20 percent

### Contrasting inclusions as follows—

*Inclusion 1:* Pachic Argixerolls (Pachic Argixerolls - fine-loamy, mixed, mesic)—4 percent

*Inclusion 2:* Aridic Haploxerolls (Aridic Haploxerolls - coarse-loamy, mixed, mesic)—2 percent

*Inclusion 3:* Small cone very gravelly coarse sandy loam (Lithic Xeric Torriorthents - loamy-skeletal, mixed, nonacid, mesic)—2 percent

*Inclusion 4:* Typic Haplaquolls (Typic Haplaquolls - fine-loamy mixed, mesic)—2 percent

### *Teguro* Soil

*Position on landscape:* Shoulders and ridges of hills and mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Singleleaf pinyon, Utah juniper

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—20

### *Typical profile*

0 to 2 inches—gravelly loam; 0 to 10 percent cobbles and 25 to 40 percent pebbles (by weight); platy structure; slightly hard, very friable; slightly acid (pH 6.4); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-4

2 to 19 inches—gravelly loam, gravelly clay loam; 0 to 10 percent cobbles and 30 to 45 percent pebbles (by weight); subangular blocky structure; hard firm, neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, estimated AASHTO classification—A-2, A-6

19 inches—unweathered bedrock

*Range in depth to bedrock:* 14 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 2.5 inches

*Water supplying capacity:* 9 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.28, T value—1, wind erodibility group—6

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

### *Indiana* Soil

*Position on landscape:* Back slopes of hills and mountains

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Wyoming big sagebrush, Thurber needlegrass, antelope bitterbrush

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—80

### *Typical profile*

0 to 13 inches—stony fine sandy loam, 20 to 25 percent cobbles and stones and 20 to 35 percent pebbles (by weight); subangular blocky structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM; estimated AASHTO classification—A-2, A-4

13 to 33 inches—gravelly clay loam, clay loam; 0 to 15 percent cobbles and 15 to 40 percent pebbles (by weight); subangular blocky structure; hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, GC; estimated AASHTO classification—A-2, A-6, A-7

33 inches—unweathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 5 inches

*Water supplying capacity:* 11 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.32, T value—2, wind erodibility group—4

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

### *Opio* Soil

*Position on landscape:* Plateaus and terraces of hills and mountains

**Parent material:** Kind—colluvium, residuum, source—volcanic rock

**Dominant present vegetation:** Low sagebrush, Thurber needlegrass, bottlebrush squirreltail

**Rock fragments on surface:** Kind—gravel, cobbles, percentage of surface covered—90

**Typical profile**

0 to 3 inches—very cobbly loam, 30 to 40 percent cobbles and 30 to 45 percent pebbles (by weight); platy structure; hard, friable; neutral (pH 7.3), nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—SM, SM-SC; estimated AASHTO classification—A-4

3 to 21 inches—clay, 0 to 5 percent cobbles and 0 to 10 percent pebbles (by weight); prismatic structure; extremely hard, very firm; neutral (pH 7.3) nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH; estimated AASHTO classification—A-7

21 inches—unweathered bedrock

**Range in depth to bedrock:** 20 to 40 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Slow

**Available water capacity:** 3.5 inches

**Water supplying capacity:** 8.5 inches

**Runoff:** Rapid

**Hydrologic group:** C

**Erosion factors (upper layer):** K value—0.10, T value—2, wind erodibility group—7

**Hazard of erosion:** By water—slight, by wind—slight

**Shrink-swell potential:** High

**Corrosivity:** To steel—moderate; to concrete—moderate

**Potential frost action:** Low

#### Contrasting Inclusions

**Inclusion 1:** Position on landscape—plane to concave toe slopes on hills and mountains; contrasting features—receives additional moisture from runoff, thick dark-colored upper layer; distinctive present vegetation—mountain big sagebrush, antelope bitterbrush, western needlegrass, common snowberry

**Inclusion 2:** Position on landscape—drainageways, small alluvia fans; contrasting feature—bedrock at a depth of more than 60 inches; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

**Inclusion 3:** Position on landscape—back slopes of hills and mountains; contrasting feature—severely eroded; distinctive present vegetation—ponderosa pine

**Inclusion 4:** Position on landscape—springs and seeps of hills and mountains; contrasting feature—wetness; distinctive present vegetation—tufted hairgrass, Nevada bluegrass, rose

#### Major Uses

Homesites, rangeland, wildlife habitat

#### Potential Native Plant Community (Table 54)

##### Woodland

*(Teguro Soil)*

**Site index for common trees:** Singeleaf pinyon—45  
Utah juniper—45

**Most important native understory plants:** Mountain big sagebrush, antelope bitterbrush, currant

##### Elements of Wildlife Habitat

**Suitability of Teguro soil for named elements:**

Wild herbaceous plants (nonirrigated)—fair

Coniferous plants (nonirrigated)—poor

Shrubs (nonirrigated)—fair

**Suitability of Indiano soil for named elements:**

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

**Suitability of Oppio soil for named elements:**

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

#### Ratings for Selected Uses

*(Teguro Soil)*

**Suitability and limitations for the following uses—**

Rangeland seeding: Fair—droughty, erodes easily

Shallow excavations: Severe—depth to rock, slope

Local roads and streets: Severe—depth to rock, slope

*(Indiano Soil)*

**Suitability and limitations for the following uses—**

Rangeland seeding: Poor—erodes easily, large stones

Shallow excavations: Severe—slope, depth to rock

Local roads and streets: Severe—slope

*(Oppio Soil)*

**Suitability and limitations for the following uses—**

Rangeland seeding: Poor—large stones

Shallow excavations: Severe—depth to rock

Local roads and streets: Severe—low strength, shrink-swell

#### Interpretive Groups

**Capability classification:** Teguro soil—Vils, nonirrigated  
Indiano soil—Vils, nonirrigated  
Oppio soil—VI s, nonirrigated

**Range site symbol:** Indiano soil—026X010N, Oppio soil—026X023N

*Woodland suitability group* Teguro soil—1d

### 1030—Xerta-Devada-Ister association

#### Map Unit Setting

*Position on landscape:* Plateaus, hills

*Elevation:* 5,800 to 6,200 feet

*Climatic data (average annual):*

Precipitation—about 11 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

#### Composition

*Xerta extremely stony clay loam, 4 to 15 percent slopes (Aridic Durixerolls - fine, montmorillonitic, mesic)—35 percent*

*Devada very stony loam, 2 to 8 percent slopes (Lithic Argixerolls - clayey, montmorillonitic, mesic)—35 percent*

*Ister very stony sandy loam, 30 to 50 percent slopes (Aridic Argixerolls - loamy-skeletal, mixed, mesic)—15 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Ducc extremely stony loam (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—5 percent

*Inclusion 2:* Indiana stony sandy loam (Aridic Argixerolls - fine-loamy mixed, mesic)—5 percent

*Inclusion 3:* Rock outcrop—5 percent

#### *Xerta Soil*

*Position on landscape:* Plateaus

*Parent material:* Kind—residuum; source—basalt

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile:*

0 to 1 inch—extremely stony clay loam; 25 to 60 percent cobbles and stones and 35 to 45 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, estimated AASHTO classification—A-6, A-7

1 to 25 inches—clay; 10 to 20 percent pebbles (by weight); prismatic structure; very hard, very firm; mildly alkaline (pH 7.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CH, estimated AASHTO classification—A-7

25 to 29 inches—indurated hardpan

29 inches—unweathered bedrock

*Range in depth to hardpan:* 20 to 40 inches

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 3.5 inches

*Water supplying capacity:* 9 inches

*Runoff:* Medium

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.05, T value—3, wind erodibility group—8

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

#### *Devada Soil*

*Position on landscape:* Plateaus, side slopes of hills

*Parent material:* Kind—residuum, colluvium; source—andesite

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—cobbles, stones; percentage of surface covered—70

*Typical profile:*

0 to 4 inches—very stony loam; 25 to 60 percent cobbles and stones and 0 to 10 percent pebbles (by weight); granular structure; slightly hard, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—SC, CL, SM-SC, CL, ML; estimated AASHTO classification—A-4, A-6

4 to 18 inches—gravelly clay; clay; 0 to 5 percent cobbles and stones and 0 to 45 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH, GC; estimated AASHTO classification—A-7

18 inches—unweathered bedrock

*Range in depth to bedrock:* 12 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 2.5 inches

*Water supplying capacity:* 8 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.17, T value—1, wind erodibility group—8

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Low

*Ister Soil*

**Position on landscape:** North- and east-facing back slopes of hills

**Parent material:** Kind—residuum, colluvium; source—volcanic rock

**Dominant present vegetation:** Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

**Rock fragments on surface:** Kind—gravel, cobbles, stones; percentage of surface covered—80

**Typical profile.**

0 to 17 inches—very stony sandy loam; 20 to 30 percent cobbles and stones and 25 to 45 percent pebbles (by weight); granular structure; slightly hard; very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SM, GM; estimated AASHTO classification—A-2, A-4

17 to 38 inches—very stony sandy clay loam, very stony clay loam; 35 to 45 percent cobbles and stones and 20 to 40 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, SC; estimated AASHTO classification—A-2, A-6, A-7

38 inches—unweathered bedrock

**Range in depth to bedrock:** 25 to 40 inches

**Depth to seasonal high water table:** More than 60 inches

**Hazard of flooding:** None

**Permeability:** Moderately slow

**Available water capacity:** 3 inches

**Water supplying capacity:** 9 inches

**Runoff:** Rapid

**Hydrologic group:** C

**Erosion factors (upper layer):** K value—0.10, T value—2; wind erodibility group—8

**Hazard of erosion:** By water—moderate, by wind—slight

**Shrink-swell potential:** Moderate

**Corrosivity:** To steel—moderate, to concrete—low

**Potential frost action:** Moderate

**Contrasting Inclusions**

**Inclusion 1:** Position on landscape—pediments of hills; contrasting feature—bedrock at a depth of 10 to 20 inches; distinctive present vegetation—singleleaf pinyon, Utah juniper

**Inclusion 2:** Position on landscape—north-facing toe slopes of hills; contrasting feature—less than 35 percent rock fragments throughout the profile; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

**Inclusion 3:** Position on landscape—ridges of hills; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

**Major Uses**

**Current uses:** Rangeland, wildlife habitat

**Potential foreseeable use:** Homesites

**Potential Native Plant Community (Table 55)****Elements of Wildlife Habitat****Suitability of Xerta soil for named elements**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Suitability of Devada soil for named elements**

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Suitability of Ister soil for named elements**

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

**Ratings for Selected Uses****(Xerta Soil)****Suitability and limitations for the following uses—**

Rangeland seeding: Poor—large stones

Shallow excavations: Severe—depth to rock

Local roads and streets: Severe—shrink-swell, low strength

**(Devada Soil)****Suitability and limitations for the following uses—**

Rangeland seeding: Poor—large stones

Shallow excavations: Severe—depth to rock

Local roads and streets: Severe—depth to rock, shrink-swell

**(Ister Soil)****Suitability and limitations for the following uses—**

Rangeland seeding: Poor—large stones

Shallow excavations: Severe—slope, depth to rock

Local roads and streets: Severe—slope

**Interpretive Groups**

**Capability classification:** Xerta soil—VI s, nonirrigated

Devada soil—VII s, nonirrigated; Ister soil—V s, nonirrigated

**Range site symbol:** Xerta soil—026X023N, Devada soil—026X023N, Ister soil—026X005N

**1410—Burnborough-Gabica association****Map Unit Setting**

**Position on landscape:** Mountains

**Elevation:** 6,800 to 7,800 feet

**Climatic data (average annual)**

Precipitation—about 16 inches

Air temperature—about 45 degrees F

Frost-free season—about 80 days

**Composition**

*Burnborough very gravelly loam, 30 to 50 percent slopes (Aridic Argixerolls - loamy-skeletal, mixed, frigid)—60 percent*

*Gabica gravelly loam, 8 to 30 percent slopes (Lithic Argixerolls - loamy-skeletal, mixed, frigid)—25 percent*

*Contrasting inclusions as follows—*

*Inclusion 1: Pachic Argixerolls (Pachic Argixerolls - fine-loamy, mixed, frigid)—6 percent*

*Inclusion 2: Rock outcrop—5 percent*

*Inclusion 3: Aridic Paleixerolls (Aridic Paleixerolls - fine montmorillonitic, frigid)—4 percent*

**Burnborough Soil**

*Position on landscape:* Back slopes of mountains

*Parent material:* Kind—colluvium; source—volcanic rock

*Dominant present vegetation:* Mountain big sagebrush, antelope bitterbrush, western needlegrass, common snowberry

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—50

*Typical profile:*

0 to 18 inches—very gravelly loam, 5 to 10 percent cobbles and 45 to 60 percent pebbles (by weight); subangular blocky structure; soft, very friable, neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, SM-SC; estimated AASHTO classification—A-2

18 to 60 inches or more—very gravelly loam, very gravelly clay loam; 15 to 25 percent cobbles and 40 to 65 percent pebbles (by weight); massive hard firm, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC, SC; estimated AASHTO classification—A-2

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderate

*Available water capacity:* 6 inches

*Water supplying capacity:* 11 inches

*Runoff:* Very rapid

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.24, T value—5; wind erodibility group—7

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—moderate; to concrete—low

*Potential frost action:* Moderate

**Gabica Soil**

*Position on landscape:* Shoulders and upper side slopes of mountains

*Parent material:* Kind—residuum, colluvium; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—70

*Typical profile:*

0 to 9 inches—gravelly loam; 5 to 20 percent cobbles and 30 to 50 percent pebbles (by weight); subangular blocky structure; soft, very friable, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GM; estimated AASHTO classification—A-4

9 to 15 inches—very gravelly loam, very stony clay loam; 10 to 50 percent cobbles and stones and 50 to 75 percent pebbles (by weight); subangular blocky structure; hard, firm, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—GC; estimated AASHTO classification—A-2, A-6

15 inches—unweathered bedrock

*Range in depth to bedrock:* 12 to 20 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 1 inch

*Water supplying capacity:* 7 inches

*Runoff:* Rapid

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.24, T value—1; wind erodibility group—8

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* Low

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

**Contrasting Inclusions**

*Inclusion 1:* Position on landscape—snow pockets on mountains, contrasting feature—thick, dark-colored upper layer, distinctive present vegetation—mountain big sagebrush, antelope bitterbrush, western needlegrass, common snowberry

*Inclusion 2:* Position on landscape—occurs randomly as small peaks and ridges on mountains, contrasting feature—bedrock exposed at the surface, distinctive present vegetation—barren

*Inclusion 3:* Position on landscape—basins of mountains, contrasting feature—claypan at a depth of 2 inches, distinctive present vegetation—low sagebrush, antelope bitterbrush, Thurber needlegrass

**Major Uses**

Rangeland wildlife habitat

**Potential Native Plant Community (Table 56)****Elements of Wildlife Habitat**

*Suitability of Burnborough soil for named elements*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Gabica soil for named elements*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Ratings for Selected Uses**

*(Burnborough Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding Poor—small stones, erodes easily

*(Gabica Soil)*

*Suitability and limitation for the following use—*

Range and seeding Poor—droughty

**Interpretive Groups**

*Capability classification:* Burnborough soil—VIs,

nonirrigated Gabica soil—VIs, nonirrigated

*Range site symbol:* Burnborough soil—026X005N,  
Gabica soil—026X028N

**1511—Cagle-Nosrac association****Map Unit Setting**

*Position on landscape:* Mountains

*Elevation:* 6,000 to 6,800 feet

*Climatic data (average annual)*

Precipitation—about 12 inches

Air temperature—about 48 degrees F

Frost free season—about 100 days

**Composition**

*Cagle extremely stony loam, 15 to 50 percent slopes (Andic Argixerolls - fine, montmorillonitic, mesic)—60 percent*

*Nosrac stony clay loam, 30 to 50 percent slopes (Andic Argixerolls - loamy-skeletal, mixed, mesic)—25 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Andic Argixerolls (Andic

Argixerolls - clayey montmorillonitic, mesic, shallow)—8 percent

*Inclusion 2:* Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—7 percent

**Cagle Soil**

*Position on landscape:* South- and west-facing back slopes of mountains

*Parent material:* Kind—residuum, colluvium, source—volcanic rock

*Dominant present vegetation:* Singleleaf pinyon, Utah juniper

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—90

*Typical profile*

0 to 4 inches—extremely stony loam, 30 to 50 percent cobbles and stones and 30 to 50 percent pebbles (by weight); granular structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—GC-SC, estimated AASHTO classification—A-6

4 to 38 inches—gravelly clay, gravelly clay loam; 0 to 5 percent cobbles and stones and 25 to 50 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—CL, CH, GC; estimated AASHTO classification—A-7

38 inches—weathered bedrock

*Range in depth to bedrock:* 20 to 40 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Slow

*Available water capacity:* 3.5 inches

*Water supplying capacity:* 8 inches

*Runoff:* Rapid

*Hydrologic group:* C

*Erosion factors (upper layer):* K value—0.24; T value—2; wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—moderate, to concrete—low

*Potential frost action:* Low

**Nosrac Soil**

*Position on landscape:* North- and east-facing back slopes of mountains

*Parent material:* Kind—colluvium, residuum, source—basalt, andesite

*Dominant present vegetation:* Mountain big sagebrush, antelope bitterbrush, western needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones, percentage of surface covered—75

*Typical profile*

0 to 9 inches—stony clay loam; 5 to 20 percent cobbles and stones and 35 to 45 percent pebbles (by weight); granular structure; soft, very friable; neutral (pH 6.8); nonsaline (less than 2

mmhos/cm) nonsodic (SAR of less than 3), estimated unified classification—GC, estimated AASHTO classification—A-6

9 to 34 inches—very gravelly clay loam; 5 to 25 percent cobbles and stones and 50 to 60 percent pebbles (by weight), subangular blocky structure, hard, firm, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm) nonsodic (SAR of less than 13) estimated unified classification—GC, estimated AASHTO classification—A-2

34 to 60 inches or more—very gravelly clay loam; 10 to 25 percent cobbles and stones and 50 to 70 percent pebbles (by weight), subangular blocky structure, hard, firm, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13) estimated unified classification—GC, estimated AASHTO classification—A-2, A-6

*Range in depth to bedrock:* 60 to 80 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 6 inches

*Water supplying capacity:* 11 inches

*Runoff:* Rapid

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.28, T value—5, wind erodibility group—8

*Hazard of erosion:* By water—severe; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—south- and west-facing back slopes of mountains; contrasting feature—more than 35 percent clay between depths of 6 and 18 inches; distinctive present vegetation—singleleaf pinyon, Utah juniper

*Inclusion 2:* Position on landscape—south-facing shoulders of mountains; contrasting feature—bedrock at a depth of 10 to 20 inches; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 57)**

##### **Woodland**

*(Cagle Soil)*

*Site index for common trees:* Singleleaf pinyon—35, Utah juniper—35

*Most important native understory plants:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

#### **Elements of Wildlife Habitat**

*Suitability of Cagle soil for named elements*

Wild herbaceous plants (nonirrigated)—fair

Coniferous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

*Suitability of Nosrac soil for named elements*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

#### **Ratings for Selected Uses**

*(Cagle Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, erodes easily

*(Nosrac Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—small stones, erodes easily

#### **Interpretive Groups**

*Capability classification:* Cagle soil—VIIIs, nonirrigated

Nosrac soil—VIIIs, nonirrigated

*Range site symbol:* Nosrac soil—Q26X005h

*Woodland suitability group:* Cagle soil—Ir

#### **1520—Duco-Smallcone-Cagle association**

##### **Map Unit Setting**

*Position on landscape:* Mountains (fig. 2)

*Elevation:* 5,400 to 6,200 feet

*Climatic data (average annual):*

Precipitation—about 12 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

##### **Composition**

*Duco very stony sandy loam, 15 to 50 percent slopes (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—40 percent*

*Smallcone very gravelly coarse sandy loam, 15 to 50 percent slopes (Lithic Xerochrepts - loamy-skeletal, mixed, nonacid, mesic)—30 percent*

*Cagle very stony clay loam, 15 to 30 percent slopes (Andic Argixerolls - fine, montmorillonitic, mesic)—15 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Indiano very stony sandy loam (Andic Argixerolls - fine-loamy, mixed, mesic)—5 percent

*Inclusion 2:* Rock outcrop—5 percent



Figure 2—Area of Duco-Smallcone-Cage association. Duco soil at right supports singleleaf pinyon; Smallcone soil at left supports Jeffrey pine

*Inclusion 3:* Heavy stony loam (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—3 percent

*Inclusion 4:* Mangue cobbly clay (Entic Chromoxererts - fine, montmorillonitic, mesic)—2 percent

#### *Duco Soil*

*Position on landscape:* North- and east-facing upper side slopes of mountains

*Parent material:* Kind—colluvium, residuum, source—andesite

*Dominant present vegetation:* Singleleaf pinyon, Utah juniper

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered: 90

#### *Typical profile*

0 to 5 inches—very stony sandy loam; 25 to 35 percent cobbles and stones and 25 to 50 percent pebbles (by weight); platy structure; soft, very friable; neutral (pH 6.8), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SM-SC, GM-GC; estimated AASHTO classification—A-2



5 to 18 inches—very cobbly sandy clay loam, very gravelly clay loam; 15 to 55 percent cobbles and stones and 45 to 70 percent pebbles (by weight); subangular blocky structure; hard, firm, neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13), estimated Unified classification—GC, estimated AASHTO classification—A-2

18 inches—unweathered bedrock

Range in depth to bedrock: 10 to 20 inches

Depth to seasonal high water table: More than 60 inches

Hazard of flooding: None

Permeability: Moderately slow

Available water capacity: 1.5 inches

Water supplying capacity: 7 inches

Runoff: Rapid

Hydrologic group: D

Erosion factors (upper layer): K value—0.17; T value—wind erodibility group—5

Hazard of erosion: By water—severe; by wind—slight

Shrink-swell potential: Moderate

Corrosivity: To steel—moderate; to concrete—low

Potential frost action: Moderate

#### *Smallcone Soil*

Position on landscape: Back slopes of mountains

Parent material: Kind—residuum, colluvium; source—altared andesite

Dominant present vegetation: Ponderosa pine

Rock fragments on surface: Kind—gravel; percentage of surface covered—90

Typical profile

0 to 6 inches—very gravelly coarse sandy loam; 0 to 10 percent cobbles and stones and 50 to 75 percent pebbles (by weight); massive; soft, very friable; strongly acid (pH 5.2); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GM, SM, GP, GM, SP-SM; estimated AASHTO classification—A-1

6 inches—weathered bedrock

Range in depth to bedrock: 4 to 10 inches

Depth to seasonal high water table: More than 60 inches

Hazard of flooding: None

Permeability: Rapid

Available water capacity: Less than 0.5 inch

Water supplying capacity: 8 inches (water is extracted by plant roots in the bedrock)

Runoff: Rapid

Hydrologic group: D

Erosion factors (upper layer): K value—0.10; T value—1, wind erodibility group—6

Hazard of erosion: By water—moderate; by wind—slight

Shrink-swell potential: Low

Corrosivity: To steel—moderate; to concrete—moderate

Potential frost action: Low

#### *Cagle Soil*

Position on landscape: Lower side slopes of mountains

Parent material: Kind—residuum, colluvium; source—volcanic rock

Dominant present vegetation: Singleleaf pinyon, Utah juniper

Rock fragments on surface: Kind—gravel, cobbles, stones; percentage of surface covered—85

Typical profile

0 to 4 inches—very stony clay loam; 25 to 35 percent cobbles and stones and 10 to 20 percent pebbles (by weight); granular structure; soft, very friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—CL, estimated AASHTO classification—A-6, A-7

4 to 24 inches—gravelly clay, gravelly clay loam; 0 to 5 percent cobbles and stones and 25 to 50 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—CL, CH, GC; estimated AASHTO classification—A-7

24 inches—weathered bedrock

Range in depth to bedrock: 20 to 40 inches

Depth to seasonal high water table: More than 80 inches

Hazard of flooding: None

Permeability: Slow

Available water capacity: 3.5 inches

Water supplying capacity: 8 inches

Runoff: Rapid

Hydrologic group: C

Erosion factors (upper layer): K value—0.28; T value—2, wind erodibility group—8

Hazard of erosion: By water—severe; by wind—slight

Shrink-swell potential: High

Corrosivity: To steel—moderate; to concrete—low

Potential frost action: Low

#### *Contrasting Inclusions*

*Inclusion 1.* Position on landscape—concave, north- and east-facing back slopes of mountains; contrasting features—bedrock at a depth of 20 to 40 inches, loamy throughout the profile; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needgrass

*Inclusion 2.* Position on landscape—shoulders of ridges on mountains; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

**Inclusion 3:** Position on landscape—shoulders of mountains; contrasting feature—lower water supplying capacity; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber need egrass

**Inclusion 4:** Position on landscape—shallow depression; areas of mountains; contrasting feature—clay throughout the profile; distinctive present vegetation—Wyoming big sagebrush, little leaf horsebrush, rabbitbrush

### Major Uses

Rangeland wildlife habitat

### Potential Native Plant Community (Table 58)

#### Woodland

##### (Duco Soil)

**Site index for common trees:** Singleleaf pinyon—35  
Utah juniper—35

**Most important native understory plants:** Wyoming big sagebrush, antelope bitterbrush, Thurber need egrass

##### (Smallcone Soil)

**Site index for common trees:** Ponderosa pine—29

**Most important native understory plants:** Antelope bitterbrush, currant, eriogonum

##### (Cagle Soil)

**Site index for common trees:** Singleleaf pinyon—35  
Utah juniper—35

**Most important native understory plants:** Wyoming big sagebrush, antelope bitterbrush, Thurber need egrass

### Elements of Wildlife Habitat

#### Suitability of Duco soil for named elements.

Wild herbaceous plants (nonirrigated)—poor  
Coniferous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

#### Suitability of Smallcone soil for named elements.

Wild herbaceous plants (nonirrigated)—very poor  
Coniferous plants (nonirrigated)—very poor  
Shrubs (nonirrigated)—very poor

#### Suitability of Cagle soil for named elements.

Wild herbaceous plants (nonirrigated)—fair  
Coniferous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—fair

### Ratings for Selected Uses

#### (Duco Soil)

##### Suitability and limitations for the following use—

Range and seeding: Poor—large stones, droughty

#### (Smallcone Soil)

##### Suitability and limitations for the following use—

Range and seeding: Poor—droughty, small stones

#### (Cagle Soil)

##### Suitability and limitation for the following use—

Range and seeding: Poor—large stones

### Interpretive Groups

**Capability classification:** Duco soil—Vils, nonirrigated, Smallcone soil—Vils, nonirrigated, Cagle soil—VIs, nonirrigated

**Woodland suitability group:** Duco soil—1r, Smallcone soil—2r, Cagle soil—1x

### 1521—Duco-Springmeyer association

### Map Unit Setting

**Position on landscape:** Hills, terraces

**Elevation:** 5,800 to 6,200 feet

**Climatic data (average annual)**

Precipitation—about 11 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

### Composition

**Duco very cobbly fine sandy loam, 15 to 30 percent slopes (Lithic Argixerolls - loamy-skeletal, mixed, mesic)—45 percent**

**Springmeyer loam, 4 to 15 percent slopes (Aridic Argixerolls - fine-loamy, mixed, mesic)—40 percent**

**Contrasting inclusions as follows—**

**Inclusion 1:** Aridic Argixerolls (Aridic Argixerolls - fine, montmorillonitic, mesic)—10 percent

**Inclusion 2:** Teguro gravelly loam (Lithic Argixerolls - loamy, mixed, frigid)—5 percent

#### Duco Soil

**Position on landscape:** Hills

**Parent material:** Kind—colluvium, residuum source—andesite

**Dominant present vegetation:** Singleleaf pinyon, Utah juniper

**Rock fragments on surface:** Kind—gravel, cobbles, percentage of surface covered—65

#### Typical profile

0 to 5 inches—very cobbly fine sandy loam, 35 to 55 percent cobbles and 25 to 50 percent pebbles (by weight), platy structure, soft, very friable, neutral (pH 6.8); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified classification—SM SC, GM GC; estimated AASHTO classification—A 2, A 4

5 to 19 inches—very cobbly sandy clay loam, very gravelly clay loam, 15 to 55 percent cobbles and stones and 45 to 70 percent pebbles (by weight), subangular blocky structure, hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3); estimated Unified

classification—GC, estimated AASHTO

classification—A-2

19 inches—unweathered bedrock

Range in depth to bedrock: 10 to 20 inches

Depth to seasonal high water table: More than 60 inches

Hazard of flooding: None

Permeability: Moderately slow

Available water capacity: 1 inch

Water supplying capacity: 7 inches

Runoff: Rapid

Hydrologic group: D

Erosion factors (upper layer): K value—0.15, T value—1, wind erodibility group—B

Hazard of erosion: By water—severe; by wind—slight

Shrink-swell potential: Moderate

Corrosivity: To steel—moderate; to concrete—low

Potential frost action: Moderate

#### *Springmeyer Soil*

Position on landscape: Alluvial terraces

Parent material: Kind—alluvium, source—various kinds of rock

Dominant present vegetation: Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

Rock fragments on surface: Kind—gravel, percentage of surface covered—20

Typical profile

0 to 10 inches—loam, 0 to 5 percent cobbles and 5 to 20 percent pebbles (by weight); subangular blocky structure; slightly hard, friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, estimated AASHTO classification—A-6

10 to 22 inches—gravely sandy clay loam, clay loam, 0 to 5 percent cobbles and stones and 5 to 35 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, estimated AASHTO classification—A-2, A-6, A-7

22 to 60 inches or more—stratified sandy loam to very gravely clay loam; 0 to 5 percent cobbles and 30 to 45 percent pebbles (by weight); massive, hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, estimated AASHTO classification—A-2

Depth to seasonal high water table: More than 60 inches

Hazard of flooding: None

Permeability: moderately slow

Available water capacity: 9 inches

Water supplying capacity: 11 inches

Runoff: Medium

Hydrologic group: B

Erosion factors (upper layer): K value—0.32, T value—5; wind erodibility group—B

Hazard of erosion: By water—moderate; by wind—slight

Shrink-swell potential: Moderate

Corrosivity: To steel—high; to concrete—low

Potential frost action: Moderate

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape— toe slopes of hills; contrasting feature—fine textured at a depth of 6 to 20 inches or more; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 2:* Position on landscape—ridges of hills; contrasting feature—weathered bedrock at a depth of less than 20 inches; distinctive present vegetation—singleleaf pinyon, Utah juniper

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 59)**

##### **Woodland**

*(Ducco Soil)*

Site index for common trees: Singleleaf pinyon—35  
Utah juniper—35

Most important native understory plants: Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

##### **Elements of Wildlife Habitat**

*Suitability of Ducco soil for named elements.*

Wild herbaceous plants (nonirrigated)—poor

Coniferous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Springmeyer soil for named elements*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

#### **Ratings for Selected Uses**

*(Ducco Soil)*

*Suitability and limitations for the following uses—*

Rangeland seeding: Poor—large stones, droughty

Shallow excavations: Severe—depth to rock, large stones, slope

Local roads and streets: Severe—depth to rock, slope

*(Springmeyer Soil)*

*Suitability and limitations for the following uses—*

Rangeland seeding: Good

Shallow excavations: Moderate—slope

Local roads and streets: Moderate—frost action, shrink-swell slope

### Interpretive Groups

*Capability classification:* Duco soil—VIIc, nonirrigated;

Springmeyer soil—VIc, nonirrigated

*Range site symbol:* Springmeyer soil—Q26X010N

*Woodland suitability group:* Duco soil—1x

## 1530—Manogue-Devada-Rock outcrop association

### Map Unit Setting

*Position on landscape:* Plateaus, terraces

*Elevation:* 6 000 to 6 600 feet

*Climatic data (average annual):*

Precipitation—about 10 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

### Composition

*Manogue very stony clay, 2 to 8 percent slopes (Entic Chromoxerolls - fine, montmorillonitic, mesic)—40 percent*

*Devada very stony loam, 4 to 15 percent slopes (Lithic Argixerolls - clayey, montmorillonitic, mesic)—35 percent*

*Rock outcrop—10 percent*

*Contrasting inclusions as follows—*

*Inclusion 1:* Andic Argixerolls (Andic Argixerolls - loamy, mixed, mesic, shallow)—5 percent

*Inclusion 2:* Andic Durixerolls (Andic Durixerolls - clayey, montmorillonitic, mesic, shallow)—4 percent

*Inclusion 3:* Indiano very stony sandy loam (Andic Argixerolls - fine-loamy, mixed, mesic)—4 percent

*Inclusion 4:* Typic Haplaquents (Typic Haplaquents - fine, montmorillonitic, nonacid, mesic)—2 percent

### Manogue Soil

*Position on landscape:* Tops of plateaus and terraces

*Parent material:* Kind—residuum, alluvium; source—basalt

*Dominant present vegetation:* Bottlebrush squirreltail, low sagebrush

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile:*

0 to 3 inches—very stony clay, 25 to 60 percent cobbles and stones and 10 to 45 percent pebbles (by weight); granular structure; hard, firm, mildly alkaline (pH 7.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8).

estimated Unified classification—GC, CH, MH; estimated AASHTO classification—A-7

3 to 41 inches—clay, silty clay; 0 to 5 percent cobbles and stones and 0 to 10 percent pebbles (by weight); prismatic structure; very hard, very firm; mildly alkaline (pH 7.5); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

41 to 63 inches—clay, silty clay; 0 to 5 percent cobbles and stones and 0 to 10 percent pebbles (by weight); angular blocky structure; very hard, very firm; moderately alkaline (pH 8.2); nonsaline to slightly saline (2 to 8 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

63 inches—weathered bedrock

*Range in depth to bedrock:* 60 to 80 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Very slow

*Available water capacity:* 8 inches

*Water supplying capacity:* 9 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.20; T value—5; wind erodibility group—8

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Low

### Devada Soil

*Position on landscape:* Lower side slopes of plateaus

*Parent material:* Kind—residuum; source—volcanic rock

*Dominant present vegetation:* Low sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—80

*Typical profile:*

0 to 4 inches—very stony loam; 25 to 60 percent cobbles and stones and 0 to 10 percent pebbles (by weight); granular structure; slightly hard, very friable; slightly acid (pH 6.4); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, SM-SC, CL-ML; estimated AASHTO classification—A-4, A-6

4 to 13 inches—gravelly clay, clay; 0 to 5 percent cobbles and stones and 0 to 45 percent pebbles (by weight); subangular blocky structure; very hard, very firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than

3) estimated Unified classification—CH, GC,  
estimated AASHTO classification—A-7  
13 inches—unweathered bedrock  
*Range in depth to bedrock*: 12 to 20 inches  
*Depth to seasonal high water table*: More than 60  
inches  
*Hazard of flooding*: None  
*Permeability*: Slow  
*Available water capacity*: 2 inches  
*Water supplying capacity*: 8 inches  
*Runoff*: Rapid  
*Hydrologic group*: D  
*Erosion factors (upper layer)*: K value—0.17; T value—  
1 wind erodibility group—8  
*Hazard of erosion*: By water—moderate, by wind—  
slight  
*Shrink-swell potential*: High  
*Corrosivity*: To steel—moderate, to concrete—low  
*Potential frost action*: Low

#### *Rock Outcrop*

*Position on landscape*: Occurs randomly as small  
peaks and ridges on plateaus  
*Dominant present vegetation*: Barren

#### *Contrasting Inclusions*

- Inclusion 1*: Position on landscape—adjacent to  
outcroppings of bedrock on plateaus, contrasting  
features—bedrock at a depth of 10 to 20 inches,  
loamy throughout the profile; distinctive present  
vegetation—low sagebrush, antelope bitterbrush,  
Thurber needlegrass  
*Inclusion 2*: Position on landscape—nearly level tops of  
plateaus, contrasting feature—hardpan at a depth of  
10 to 20 inches; distinctive present vegetation—low  
sagebrush, antelope bitterbrush, Thurber  
needlegrass  
*Inclusion 3*: Position on landscape—north-facing,  
concave back slopes of plateaus and terraces,  
contrasting feature—loamy throughout the profile,  
distinctive present vegetation—Wyoming big  
sagebrush, antelope bitterbrush, Thurber  
needlegrass  
*Inclusion 4*: Position on landscape—undrained basins  
of plateaus, contrasting feature—wetness (covered  
with water in winter and spring of most years),  
distinctive present vegetation—sedge, rush

#### **Major Uses**

Rangeland wildlife habitat

#### **Potential Native Plant Community (Table 60)**

#### **Elements of Wildlife Habitat**

*Suitability of Manogue soil for named elements*.  
Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

#### *Suitability of Devada soil for named elements*

Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

##### *(Manogue Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Poor—large stones

##### *(Devada Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Poor—large stones, droughty

#### **Interpretive Groups**

*Capability classification*: Manogue soil—V Is  
nonirrigated, Devada soil—VIIIs, nonirrigated Rock  
outcrop—VIIIIs

*Range site symbol*: Manogue soil—026X027N, Devada  
soil—026X023N

#### **1531—Manogue-Springmeyer association**

#### **Map Unit Setting**

*Position on landscape*: Pediments, alluvial fans

*Elevation*: 5,800 to 6,400 feet

*Climatic data (average annual)*

Precipitation—about 10 inches

Air temperature—about 49 degrees F

Frost-free season—about 100 days

#### **Composition**

*Manogue cobbly clay, 2 to 8 percent slopes (Entic  
Chromoxererts - fine, montmorillonitic, mesic)*—50  
percent

*Springmeyer stony loam, 4 to 15 percent slopes (Aridic  
Argixerolls - fine-loamy, mixed, mesic)*—35 percent

*Contrasting inclusions as follows—*

*Inclusion 1*: Xman very stony loam (Xerollic  
Haplargids - clayey, montmorillonitic mesic  
shallow)—5 percent

*Inclusion 2*: Ardic Haploxerolls (Aridic  
Haploxerolls - loamy-skeletal, mixed, mesic)—5  
percent

*Inclusion 3*: Ardic Argixerolls (Aridic  
Argixerolls - loamy-skeletal, mixed, mesic)—5  
percent

#### *Manogue Soil*

*Position on landscape*: Pediments

*Parent material*: Kind—residuum source—basalt

*Dominant present vegetation*: Low sagebrush,  
bottlebrush squirreltail

*Rock fragments on surface*: Kind: gravel cobbles,  
percentage of surface covered—80

*Typical profile*:

0 to 3 inches—cobbley clay: 25 to 30 percent cobbles and 20 to 30 percent pebbles (by weight); granular structure; hard, very firm; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

3 to 41 inches—clay, silty clay: 0 to 5 percent cobbles and 0 to 10 percent pebbles (by weight); prismatic structure; very hard, very firm; mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

41 to 63 inches—clay, silty clay: 0 to 5 percent cobbles and stones and 0 to 10 percent pebbles (by weight); angular blocky structure; very hard, very firm; moderately alkaline (pH 8.2); nonsaline to slightly saline (2 to 8 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

63 inches—weathered bedrock

*Range in depth to bedrock:* 60 to 80 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Very slow

*Available water capacity:* 8 inches

*Water supplying capacity:* 9 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.24, T value—5, wind erodibility group—4

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high to concrete—low

*Potential frost action:* Low

#### *Springmeyer Soil*

*Position on landscape:* Alluvial fans

*Parent material:* Kind—alluvium; source—various kinds of rock

*Dominant present vegetation:* Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

*Rock fragments on surface:* Kind—gravel; percentage of surface covered—50

*Typical profile:*

0 to 16 inches—stony loam: 5 to 20 percent cobbles and stones and 5 to 25 percent pebbles (by weight); subangular blocky structure; slightly hard, very friable; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL, SM, SC, CL, ML; estimated AASHTO classification—A-4, A-6

16 to 48 inches—gravelly sandy clay loam: clay loam; 0 to 5 percent cobbles and stones and 15 to 35 percent pebbles (by weight); subangular blocky structure; hard, firm; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC, CL; estimated AASHTO classification—A-2, A-6, A-7

48 to 60 inches or more—stratified sandy loam to very gravelly clay loam: 0 to 10 percent cobbles and stones and 30 to 45 percent pebbles (by weight); massive, hard, friable; neutral (pH 7.0); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 3); estimated Unified classification—SC; estimated AASHTO classification—A-2

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Moderately slow

*Available water capacity:* 9 inches

*Water supplying capacity:* 11 inches

*Runoff:* Medium

*Hydrologic group:* B

*Erosion factors (upper layer):* K value—0.32; T value—5, wind erodibility group—5

*Hazard of erosion:* By water—moderate; by wind—slight

*Shrink-swell potential:* Moderate

*Corrosivity:* To steel—high to concrete—low

*Potential frost action:* Moderate

#### *Contrasting inclusions*

*Inclusion 1:* Position on landscape—pediments; contrasting features—bedrock at a depth of 10 to 20 inches, lower water supplying capacity; distinctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush, squirreltail

*Inclusion 2:* Position on landscape—upper part of alluvial fans; contrasting features—no layer of clay accumulation, receives additional moisture from runoff; distinctive present vegetation—basin wildrye, basin big sagebrush, bluegrass

*Inclusion 3:* Position on landscape—inset fans; contrasting feature—more than 35 percent gravel throughout the profile; distinctive present vegetation—Wyoming big sagebrush, antelope bitterbrush, Thurber needlegrass

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 61)**

#### **Elements of Wildlife Habitat**

*Suitability of Manogue soil for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

*Suitability of Springmeyer soil for named elements:*

Wild herbaceous plants (nonirrigated)—fair

Shrubs (nonirrigated)—fair

**Ratings for Selected Uses**

*(Manogue Soil)*

*Suitability and limitations for the following use—*

Rangeland seeding: Fair—too clayey, large stones

*(Springmeyer Soil)*

*Suitability and limitation for the following use—*

Rangeland seeding: Fair—large stones

**Interpretive Groups**

*Capability classification:* Manogue soil—VIIc, nonirrigated; Springmeyer soil—VIc, nonirrigated

*Range site symbol:* Manogue soil—026X027N, Springmeyer soil—026X010N

**1533—Manogue cobbly clay, 2 to 8 percent slopes**

**Map Unit Setting**

*Position on landscape:* Plateaus

*Elevation:* 5,800 to 6,000 feet

*Climatic data (average annual):*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 100 days

**Composition**

*Manogue cobbly clay, 2 to 8 percent slopes (Entic Chromoxererts - fine montmorillonitic, mesic)*

*Contrasting inclusions as follows—*

*inclusion 1:* Reno cobbly sandy loam, 4 to 15 percent slopes (Abruptic Xerollic Durargids - fine, montmorillonitic, mesic)—8 percent

*inclusion 2:* Rock outcrop—2 percent

*Manogue Soil*

*Position on landscape:* Plateaus

*Parent material:* Kind—residuum; source—basalt

*Dominant present vegetation:* Low sagebrush, bottlebrush squirreltail, rabbitbrush

*Rock fragments on surface:* Kind—gravel cobbles, percentage of surface covered—80

*Typical profile*

0 to 3 inches—cobbly clay, 15 to 20 percent cobbles and 20 to 30 percent pebbles (by weight); granular structure; hard, very firm; neutral (pH 6.8); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 8); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

3 to 41 inches—clay, silty clay; 0 to 5 percent cobbles and 0 to 10 percent pebbles (by weight); prismatic structure; very hard, very firm, mildly alkaline (pH 7.6); nonsaline (less than 2 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

41 to 63 inches—clay, silty clay; 0 to 5 percent cobbles and 0 to 10 percent pebbles (by weight); angular blocky structure; very hard, very firm, moderately alkaline (pH 8.2); nonsaline to slightly saline (2 to 8 mmhos/cm); nonsodic (SAR of less than 13); estimated Unified classification—CH, MH; estimated AASHTO classification—A-7

63 inches—weathered bedrock

*Range in depth to bedrock:* 60 to 80 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Very slow

*Available water capacity:* 8 inches

*Water supplying capacity:* 9 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—Q 24, T value—5, wind erodibility group—4

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high to concrete—low

*Potential frost action:* Low

*Contrasting inclusions*

*Inclusion 1:* Position on landscape—alluvial fans on plateaus, contrasting features—indurated hardpan at a depth of 20 to 40 inches, loamy in the upper 5 inches; distinctive present vegetation—low sagebrush, antelope bitterbrush, Thurber needlegrass

*Inclusion 2:* Position on landscape—occurs randomly as small peaks and ridges on plateaus; contrasting feature—bedrock exposed at the surface; distinctive present vegetation—barren

**Major Uses**

Rangeland, wildlife habitat

**Potential Native Plant Community (Table 62)**

**Elements of Wildlife Habitat**

*Suitability for named elements:*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

**Ratings for Selected Uses**

*Suitability and limitations for the following use—*

Rangeland seeding: Fair too clayey, large stones

### Interpretive Groups

*Capability classification:* Vlls, nonirrigated

*Range site symbol:* 026X027N

## 1534—Manogue-Hefed-Rock outcrop association

### Map Unit Setting

*Position on landscape:* Plateaus

*Elevation:* 5,000 to 6,000 feet

*Climatic data (average annual):*

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 100 days

### Composition

*Manogue very stony clay, 2 to 15 percent slopes (Entic Chromoxererts - fine, montmorillonitic, mesic)—40 percent*

*Hefed very stony sandy loam, 30 to 50 percent slopes (Xerollic Haplargids - loamy-skeletal, mixed, mesic)—25 percent*

*Rock outcrop—20 percent*

*Contrasting inclusions as follows—*

*inclusion 1:* Olac very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—6 percent

*inclusion 2:* Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal, mixed, mesic)—5 percent

*inclusion 3:* Rubble and—4 percent

### Manogue Soil

*Position on landscape:* Plateaus

*Parent material:* Kind—residuum, source—basalt

*Dominant present vegetation:* Shadscale, littleleaf horsebrush, bottlebrush squirreltail

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—90

*Typical profile*

0 to 3 inches—very stony clay; 25 to 60 percent cobbles and stones and 10 to 45 percent pebbles (by weight); granular structure, hard, very firm, neutral (pH 6.8), nonsaline (less than 4 mmhos/cm), nonsodic (SAR of less than 8), estimated Unified classification—GC, CH, MH, estimated AASHTO classification—A-7

3 to 41 inches—clay, silty clay, 0 to 5 percent cobbles and stones and 0 to 10 percent pebbles (by weight); prismatic structure, very hard, very firm, mildly alkaline (pH 7.6), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13), estimated Unified classification—CH, MH, estimated AASHTO classification—A-7

41 to 63 inches—clay, silty clay, 0 to 5 percent cobbles and stones and 0 to 10 percent pebbles (by weight); angular blocky structure; very hard, very firm; moderately alkaline (pH 8.2), nonsaline to slightly saline (2 to 8 mmhos/cm), nonsodic (SAR of less than 13), estimated Unified classification—CH, MH, estimated AASHTO classification—A-7

63 inches or more—weathered bedrock

*Range in depth to bedrock:* 60 to 80 inches

*Depth to seasonal high water table:* More than 60 inches

*Hazard of flooding:* None

*Permeability:* Very slow

*Available water capacity:* 8 inches

*Water supplying capacity:* 9 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.20, T value—5; wind erodibility group—8

*Hazard of erosion:* By water—slight, by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high, to concrete—low

*Potential frost action:* Low

### Hefed Soil

*Position on landscape:* Side slopes of plateaus

*Parent material:* Kind—colluvium, source—basalt

*Dominant present vegetation:* Wyoming big sagebrush, green ephedra, desert needlegrass

*Rock fragments on surface:* Kind—gravel, cobbles, stones; percentage of surface covered—85

*Typical profile*

0 to 2 inches—very stony sandy loam; 30 to 45 percent cobbles and stones and 30 to 40 percent pebbles (by weight); platy structure; slightly hard, very friable, neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—SM-SC, estimated AASHTO classification—A-2

2 to 13 inches—very gravelly sandy loam, very gravelly loam, 5 to 10 percent cobbles and 45 to 65 percent pebbles (by weight); subangular blocky structure; hard, friable; neutral (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 3), estimated Unified classification—GC; estimated AASHTO classification—A-2

13 to 60 inches or more—stratified very gravelly loamy sand to very cobbly sandy loam; 15 to 40 percent cobbles and 25 to 50 percent pebbles (by weight); massive, soft, very friable; discontinuous, hard and brittle (layers of weak silica cementation); moderately alkaline (pH 8.2), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13), estimated Unified



classification—SM estimated AASHTO

classification—A-1 A-2

Depth to seasonal high water table: More than 60 inches

Hazard of flooding: None

Permeability: Moderately rapid

Available water capacity: 4 inches

Water supplying capacity: 8 inches

Runoff: Rapid

Hydrologic group: B

Erosion factors (upper layer): K value—0.10; T value—5 wind erodibility group—6

Hazard of erosion: By water—moderate; by wind—slight

Shrink-swell potential: Moderate

Corrosivity: To steel—high, to concrete—low

Potential frost action: Low

#### Rock Outcrop

Position on landscape: Occurs randomly as small peaks and ridges

Dominant present vegetation: Barren

#### Contrasting Inclusions

**Inclusion 1:** Position on landscape—convex shoulders of plateaus; contrasting feature—bedrock at a depth of 10 to 20 inches; distinctive present vegetation—low sagebrush, Thurber needlegrass, bottlebrush squirrel tail

**Inclusion 2:** Position on landscape—side slopes of plateaus; contrasting features—bedrock at a depth of 10 to 20 inches; distinctive present vegetation—Wyoming big sagebrush, green ephedra, desert needlegrass

**Inclusion 3:** Position on landscape—slightly concave swales of plateaus; contrasting features—more than 80 percent stones on the surface; distinctive present vegetation—barren

#### Major Uses

Rangeland wildlife habitat

#### Potential Native Plant Community (Table 63)

#### Elements of Wildlife Habitat

**Suitability of Manogue soil for named elements:**  
Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

**Suitability of Hefed soil for named elements:**  
Wild herbaceous plants (nonirrigated)—poor  
Shrubs (nonirrigated)—poor

#### Ratings for Selected Uses

(Manogue Soil)

**Suitability and limitation for the following use—**

Range and seeding: Poor—large stones

(Hefed Soil)

**Suitability and limitation for the following use—**

Range and seeding: Poor—large stones

#### Interpretive Groups

**Capability classification:** Manogue soil—V is nonirrigated; Hefed soil—Vils. nonirrigated; Rock outcrop—VIIIIs

**Range site symbol:** Manogue soil—026X027N; Hefed soil—026X022N

#### 1535—Manogue very stony clay, 2 to 15 percent slopes

#### Map Unit Setting

**Position on landscape:** Plateaus

**Elevation:** 5,100 to 5,400 feet

**Climatic data (average annual):**

Precipitation—about 9 inches

Air temperature—about 50 degrees F

Frost-free season—about 100 days

#### Composition

**Manogue very stony clay, 2 to 15 percent slopes (Entic Chromoxererts - fine, montmorillonitic, mesic)**

**Contrasting inclusions as follows—**

**Inclusion 1:** Old very stony loam (Lithic Xerollic Haplargids - loamy-skeletal mixed, mesic)—8 percent

**Inclusion 2:** Old Camp very stony loam (Lithic Xerollic Haplargids - loamy-skeletal mixed mesic)—5 percent

**Inclusion 3:** Rock outcrop—2 percent

#### Manogue Soil

**Position on landscape:** Plateaus

**Parent material:** Kind—residuum, source—basalt

**Dominant present vegetation:** Shadscale, iliceaf horsebrush, bottlebrush squirrel tail

**Rock fragments on surface:** Kind—gravel cobbles stones, percentage of surface covered—90

**Typical profile**

0 to 3 inches—very stony clay, 25 to 60 percent cobbles and stones and 10 to 35 percent pebbles (by weight), granular structure, hard firm neutral (pH 6.8), nonsaline (less than 4 mmhos/cm) slightly saline (4 to 8 mmhos/cm) estimated Unified classification—GC, CH, MH, estimated AASHTO classification—A-7

3 to 41 inches—clay silty clay, 0 to 5 percent cobbles and stones and 0 to 10 percent pebbles (by weight), prismatic structure, very hard, very firm; mildly alkaline (pH 7.0), nonsaline (less than 2 mmhos/cm), nonsodic (SAR of less than 13),

estimated Unified classification—CH, MH;  
estimated AASHTO classification—A-7

41 to 63 inches—clay, silty clay, 0 to 5 percent  
cobbles and stones and 0 to 10 percent pebbles  
(by weight); angular blocky structure; very hard,  
very firm; moderately alkaline (pH 8.2); nonsaline  
to slightly saline (2 to 8 mmhos/cm); nonsodic  
(SAR of less than 13); estimated Unified  
classification—CH, MH; estimated AASHTO  
classification—A-7

63 inches—weathered bedrock

*Range in depth to bedrock:* 60 to 80 inches

*Depth to seasonal high water table:* More than 60  
inches

*Hazard of flooding:* None

*Permeability:* Very slow

*Available water capacity:* 8 inches

*Water supplying capacity:* 9 inches

*Runoff:* Medium

*Hydrologic group:* D

*Erosion factors (upper layer):* K value—0.20; T value—  
5; wind erodibility group—8

*Hazard of erosion:* By water—slight; by wind—slight

*Shrink-swell potential:* High

*Corrosivity:* To steel—high; to concrete—low

*Potential frost action:* Low

#### *Contrasting Inclusions*

*Inclusion 1:* Position on landscape—back slopes of  
plateaus; contrasting feature—bedrock at a depth of

10 to 20 inches; distinctive present vegetation—low  
sagebrush, Thurber needlegrass, bottlebrush  
squirreltail

*Inclusion 2:* Position on landscape—north-facing lower  
side slopes of plateaus; contrasting feature—  
bedrock at a depth of 10 to 20 inches; distinctive  
present vegetation—Wyoming big sagebrush, green  
ephedra, desert needlegrass

*Inclusion 3:* Position on landscape—occurs randomly  
as small peaks and ridges on plateaus; contrasting  
feature—bedrock exposed at the surface; distinctive  
present vegetation—barren

#### **Major Uses**

Rangeland, wildlife habitat

#### **Potential Native Plant Community (Table 64)**

#### **Elements of Wildlife Habitat**

##### *Suitability for named elements*

Wild herbaceous plants (nonirrigated)—poor

Shrubs (nonirrigated)—poor

#### **Ratings for Selected Uses**

##### *Suitability and limitation for the following use—*

Rangeland seeding: Poor—large stones

#### **Interpretive Groups**

*Capability classification:* VIIc, nonirrigated

*Range site symbol:* 026X027N

## Prime Farmland

In this section, prime farmland is defined and discussed and the prime farmland soils in this survey area are listed.

Prime farmland is of major importance in providing the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, seed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. Adequate moisture and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing food and fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water control structures. Public land is land not available for farming in

national forests, national parks, military reservations, and state parks.

Prime farmland soils commonly get an adequate and dependable supply of moisture from precipitation or irrigation. Temperature and length of growing season are favorable, and level of acidity or alkalinity is acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not flooded during the growing season.

Soils that have a high water table are subject to flooding, or are droughty, may qualify as prime farmland soils if the limitations are overcome by drainage, flood control, or irrigation. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information on the criteria for prime farmland soils can be obtained at the local office of the Soil Conservation Service.

About 1,450 acres, or nearly 0.9 percent, of the survey area would meet the requirements for prime farmland if an adequate and dependable supply of irrigation water were available.

The following map units or parts of map units meet the soil requirements for prime farmland when irrigated. This list does not constitute a recommendation for a particular land use.

- 170 Ackley-Vela complex, 2 to 8 percent slopes (Ackley part only)
- 231 Sagoupe sandy loam, 0 to 2 percent slopes, rarely flooded
- 290 Springmeyer Variant loam, 0 to 2 percent slopes
- 571 Ackley gravelly sandy loam, 2 to 4 percent slopes
- 572 Saralegui-Isoide association (Saralegui part only)



# Use and Management of the Soils

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This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils as rangeland and woodland, as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities, and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

## Rangeland

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Rangeland management requires a knowledge of the kinds of soil and of the potential plant community. It also requires an evaluation of the present range condition. Rangeland condition is determined by comparing the present plant community with the potential natural plant

community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in rangeland management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Much of the survey area was overgrazed in the period 1960-80, when mining activity was at its peak. The effects of this overuse still remain in some areas.

Proper rangeland management can bring rangeland productivity back to its optimum as it has in many parts of the area.

## Engineering

This section provides information for planning and uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the table "Building Site Development." The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

*Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.*

*The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.*

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses, (2) make preliminary estimates of construction conditions, (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables, (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons, (5) plan detailed on-site investigations of soils and geology, (6) locate potential sources of gravel, sand, earthfill, and topsoil, (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation, and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps and soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

### Building Site Development

Table 69 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, septic tank absorption fields, and local roads and streets. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

*Dwellings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

*Septic tank absorption fields* are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installations.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

*Local roads and streets* have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil)

shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Table 69 also gives information about the soils as a source of roadfill. The soils are rated *good, fair, or poor* as a source of roadfill. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 to 6 feet.

*Roadfill* is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the upper layer to a depth of 5 to 6 feet. It is assumed that soil

layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.





# Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features listed in tables are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings and pits are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

## Engineering Index Properties

Table 70 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 to 6 feet.

*Depth* to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added; for example, "gravelly." Textural terms are defined in the Glossary.

*Classification* of the soils is determined according to the system adopted by the American Association of

State Highway and Transportation Officials (1), and the Unified soil classification system (2).

The Unified system classifies soils according to properties that affect their use as construction materials. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC, silty and clayey sands as ML, CL, OL, MH, CH, and OH, and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification; for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

*Rock fragments* larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

*Liquid limit and plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

## Physical and Chemical Properties

Table 71 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

**Depth** to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

**Clay** as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to absorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

**Permeability** refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

**Available water capacity** refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

**Soil reaction** is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

**Salinity** is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and

laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of the soil if used as construction material, and the potential of the soil to corrode metal and concrete.

**Shrink-swell potential** is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 8 percent, is sometimes used.

**Erosion factor K** indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion.

**Erosion factor T** is an estimate of the maximum average rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

**Wind erodibility groups** are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the amount of stable aggregates 0.84 millimeters in size. These are represented idealistically by USDA textural classes. Soils containing rock fragments can occur in any group.

1. Sand, fine sand, and very fine sand. These soils generally are not suitable for crops. They are extremely erodible, and vegetation is difficult to establish on them.

2. Loamy sand, loamy fine sand, and loamy very fine sand. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Sandy loam, coarse sandy loam, fine sandy loam, and very fine sandy loam. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clay silty clay, clay loam, and silty clay loam that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loam and sandy clay that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loam. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loam that is less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to wind erosion.

that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay that has high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

*Frequency of flooding* is given in table 72. Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered to be flooding. Standing water in swamps and marshes or in closed depressional areas is considered to be ponding.

Frequency is estimated. It is expressed as *none*, *rare*, *occasional*, and *frequent*. *None* means that flooding is not probable; *rare* that it is unlikely but is possible under unusual weather conditions (chance of flooding in any year is 0 to 5 percent); *occasional* that it occurs infrequently under normal weather conditions (chance of flooding in any year is 5 to 50 percent); and *frequent* that it occurs often under normal weather conditions (chance of flooding in any year is more than 50 percent).

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and level of flooding and the relation of each soil on the landscape to historic flood. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

*Depth to high water table (seasonal)* is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. A water table that is seasonally high for less than 1 month is not indicated in the table.

The two numbers in the column "Depth to high water table" indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a

## Soil and Water Features

Table 72 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sand or gravelly sand. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils

depth of 6 feet or that the water table exists for less than a month.

*Depth to bedrock* is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

A *cemented pan* is a cemented or indurated subsurface layer at a depth of 5 feet or less. Such a pan causes difficulty in excavation. Pans are classified as thin or thick. A *thin* pan is one that is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A *thick* pan is one that is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

*Potential frost action* is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density,

permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

*Risk of corrosion* pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

# Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (14). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 73 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

**ORDER.** Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

**SUBORDER.** Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent* from Entisol).

**GREAT GROUP.** Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons, soil moisture and temperature regimes, and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquents (*Hapl*, meaning minimal horizonation, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

**SUBGROUP.** Each great group has a typical subgroup. Other subgroups are intergrades or extragrades. The typical is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceded by the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquents.

**FAMILY.** Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties

and characteristics considered are particle-size class, mineral content, temperature regime, thickness of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, nonacid, mesic Typic Haplaquents.

**SERIES.** The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

## Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetical order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (13). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (14). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

### Ackley Series

The Ackley series consists of very deep, well drained soils that formed in alluvium derived from various kinds of rock. These soils are on fans and terraces. Slope is 0 to 4 percent.

**Taxonomic class:** Fine-loamy, mixed, mesic Xerollic Haplargids.

**Typical pedon:** Ackley gravelly sandy loam, 2 to 4 percent slopes, lat. 39°18'53" N, long. 119°32'33" W, in sec. 29, T. 17 N., R. 22 E.

A1—0 to 1 inch, light brownish gray (10YR 6/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive, soft, very friable, nonsticky and

nonplastic; many very fine roots; many very fine interstitial pores; 25 percent pebbles; neutral; clear smooth boundary

A2—1 to 3 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist, strong thick platy structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores and common very fine tubular pores; 15 percent pebbles; neutral; abrupt smooth boundary

Bt—3 to 27 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist, strong coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common very fine tubular pores; continuous thin clay films on ped faces; some discontinuous lime coatings on undersides of rock fragments beginning at a depth of 25 inches; 10 percent pebbles and 4 percent cobbles; neutral; clear wavy boundary

Bk1—27 to 43 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist, massive, slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; lime coatings on the undersides of rock fragments; slightly effervescent; 10 percent pebbles; moderately alkaline; clear wavy boundary

Bk2—43 to 60 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist, massive, slightly hard, very friable, nonsticky and nonplastic; few very fine interstitial pores; lime coatings on the undersides of rock fragments; strongly effervescent; 10 percent pebbles; moderately alkaline

#### Range in characteristics

*Profile:* Soil moisture - moist in winter and spring, dry in summer and fall; soil temperature - 50 to 53 degrees F; combined thickness of A and Bt horizons - 20 to 40 inches; other features - pebble mulch on surface of some pedons

*Control section:* Clay content - 18 to 27 percent; rock fragment content - 0 to 15 percent pebbles and cobbles; reaction - A and Bt horizons are neutral or slightly acid; depth to carbonates - 25 to 50 inches

*A horizon:* Hue - 10YR, 2.5Y, value - 5 or 6 dry, 3 or 4 moist; chroma - 2 or 3

*Bt horizon:* Hue - 10YR, 2.5Y, value - 5 or 6 dry, 3 or 4 moist; chroma - 2, 3, or 4; texture - sandy loam, sandy clay loam, or loam

*Bk horizon:* Hue - 10YR, 2.5Y, value - 5 to 8 dry, 3 to 6 moist; chroma - 2, 3, or 4; reaction - neutral to strongly alkaline; effervescence - very slightly effervescent to strongly effervescent

### Bombadil Series

The Bombadil series consists of very shallow, well drained soils that formed in residuum and colluvium

weathered from basic igneous rock. These soils are on ridges and convex back slopes of hills. Slope is 8 to 50 percent

**Taxonomic class:** Loamy mixed, mesic, lithic Xerolic Haplargids

**Typical pedon:** A Bombadil stony loam 8 to 30 percent slopes, in an area of Olac-Bombadil Rock outcrop association, lat 39°21'21" N., long 119°30'16" W., in sec. 10, T. 17 N. R. 22 E

A1—0 to 3 inches; light brownish gray (10YR 6/2) stony loam, dark grayish brown (10YR 4/2) moist, moderate medium granular structure; soft, very friable, nonsticky and nonplastic; common fine roots and many very fine roots; many fine and very fine interstitial pores; 35 percent pebbles, 4 percent cobbles, and 1 percent stones; neutral; abrupt smooth boundary

Bt1—3 to 5 inches; grayish brown (10YR 5/2) gravelly loam, dark brown (10YR 3/3) moist, moderate medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few medium roots and common fine and very fine roots; common medium and fine interstitial and tubular pores; common very thin clay coatings and bridges on sand grains; 15 percent pebbles; neutral; clear smooth boundary

Bt2—5 to 8 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 4/3) moist, moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common medium roots and many fine and very fine roots; common medium and fine tubular pores; 20 percent pebbles; many thin clay films on ped faces and in pores; neutral; clear smooth boundary

Bt3—8 to 10 inches; yellowish brown (10YR 5/4) gravelly loam, dark brown (10YR 4/3) moist, moderate medium subangular blocky structure; hard, friable, sticky and plastic; common medium roots and many fine and very fine roots; many fine and very fine tubular pores; 25 percent pebbles; many thin and moderately thick clay films on ped faces and in pores; neutral; abrupt smooth boundary

R—10 inches; andesite that is fractured in the upper 2 to 3 inches

#### Range in characteristics

*Profile:* Soil moisture - moist in winter and spring, dry in summer and early in fall; soil temperature - 47 to 52 degrees F; depth to bedrock - 7 to 14 inches

*Control section:* Clay content - 15 to 25 percent; rock fragment content - 10 to 25 percent; reaction - neutral or mildly alkaline

*A horizon:* Hue - 10YR or 7.5YR; value - 5 or 6 dry, 3 or 4 moist; chroma - 2 or 3; structure - moderate thin platy, granular or fine subangular blocky

*Bt horizon:* Hue - 10YR or 7.5YR; value - 5 or 6 dry 3 to 5 moist; chroma - 3 or 4 (except 2 in the upper part of some pedons); clay content - 18 to 27 percent; rock fragment content (average) - 10 to 20 percent

## Burnborough Series

The Burnborough series consists of deep and very deep, well drained soils that formed in residuum and colluvium derived dominantly from andesitic and rhyolitic rock. These soils are on hillsides. Slope is 30 to 50 percent.

**Taxonomic class:** Loamy-skeletal, mixed, Inigid Andic Argixerolls

**Typical pedon:** A Burnborough very gravelly loam 30 to 50 percent slopes in an area of Burnborough-Gabica association, lat. 38°20'26" N., long. 119°39'11" W., in sec. 17, T. 17 N., R. 21 E.

- A1—0 to 4 inches, grayish brown (10YR 5/2) very gravelly loam, very dark brown (10YR 2/2) moist, weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots, common fine interstitial pores, 30 percent pebbles and 5 percent cobbles, neutral clear smooth boundary
- A2—4 to 9 inches, dark grayish brown (10YR 4/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist, weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic, many very fine, fine, medium, and coarse roots; many fine tubular pores, 25 percent pebbles and 10 percent cobbles, neutral clear smooth boundary
- Bt1—9 to 19 inches, brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; hard, firm, sticky and plastic, many very fine, fine, medium, and coarse roots; many fine tubular pores, 30 percent pebbles and 15 percent cobbles; common thin and very thin clay films on ped faces and in pores, neutral clear wavy boundary
- Bt2—19 to 30 inches, yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; few fine tubular pores, 30 percent pebbles and 15 percent cobbles; common thin and very thin clay films on ped faces and in pores, slightly acid, gradual wavy boundary
- Bt3—30 to 40 inches, yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky and plastic, common very fine and fine roots, few fine tubular pores, 35 percent pebbles and 15 percent cobbles; common thin and very thin clay films on ped faces and in pores; slightly acid, gradual wavy boundary

C—40 to 60 inches, 80 percent yellowish brown (10YR 5/4) and 20 percent yellowish brown (10YR 5/6) very gravelly loam, 80 percent dark yellowish brown (10YR 4/4) and 20 percent dark yellowish brown (10YR 4/6) moist; massive, slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots, few fine tubular pores, 40 percent pebbles and 15 percent cobbles, slightly acid.

### Range in characteristics

*Profile:* Soil moisture - moist in winter and spring, dry in summer and fall (depth of wetting exceeds 30 inches in most years); soil temperature - 42 to 46 degrees F; depth to bedrock - 40 to 80 inches; reaction - slightly acid or neutral throughout; mollic epipedon - 10 to 20 inches thick and includes the Bt1 horizon

*A horizon:* Value - 4 or 5 dry, 2 or 3 moist; chroma - 2 or 3

*Bt1 horizon (where present):* Value - 4 or 5 dry; chroma - 2 or 3; texture - very gravelly sandy loam or very gravelly loam; clay content - 18 to 25 percent; rock fragment content - 35 to 50 percent, mostly pebbles

*Bt2 and Bt3 horizons:* Value - 5 or 6 dry, 3 to 5 moist; chroma - 3 or 4 dry; texture - very gravelly loam or very gravelly clay loam; clay content - 18 to 35 percent; rock fragment content - 35 to 60 percent, mostly pebbles

*C horizon (where present):* Value - 5 or 6 dry, 4 or 5 moist; chroma - 2 to 6; texture - loam to sandy sand; rock fragment content - 35 to 75 percent, mostly pebbles

## Cagle Series

The Cagle series consists of moderately deep, well drained soils that formed in residuum and colluvium weathered from andesite. These soils are on mountains. Slope is 15 to 50 percent.

**Taxonomic class:** Fine, montmorillonitic, mesic Andic Argixerolls

**Typical pedon:** A Cagle extremely stony loam 15 to 50 percent slopes in an area of Cagle-Nosrac association, lat. 39°23'54" N., long. 119°32'37" W., in sec. 29, T. 18 N., R. 22 E.

O—1 inch to 0, pine needles.

- A1—0 to 4 inches, dark grayish brown (10YR 4/2) extremely stony loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots, many very fine and fine interstitial pores, 20 percent pebbles, 25 percent cobbles, and 25 percent stones; neutral; clear smooth boundary
- Bt1—4 to 11 inches, brown (10YR 4/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium and coarse subangular blocky structure; very hard, firm, very sticky and plastic; many medium and coarse roots and common very fine



and fine roots; common very fine tubular pores; continuous thin and moderately thick clay films lining pores and on ped faces; 15 percent pebbles and 5 percent cobbles; slightly acid; clear wavy boundary

**Bt2**—11 to 26 inches; dark yellowish brown (10YR 4/4) gravelly clay, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; very hard, very firm, very sticky and very plastic; common medium and coarse roots and few very fine and fine roots; many very fine tubular pores; common pressure faces; common thin to moderately thick clay films lining pores and on ped faces; 10 percent pebbles and 5 percent cobbles; neutral; gradual wavy boundary

**Bt3**—26 to 38 inches; yellowish brown (10YR 5/4) gravelly clay, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; few medium roots; common fine roots; and few very fine roots; common very fine tubular pores; many pressure faces and few thin to moderately thick clay films lining pores and on ped faces; 10 percent pebbles and 5 percent cobbles; neutral; abrupt smooth boundary

**Cr**—38 inches; weathered andesite

#### Range in characteristics

*Profile.* Soil moisture - usually dry, moist in winter and spring, dry in mid-June to October; soil temperature - 47 to 53 degrees F; mollic epipedon thickness - 7 to 18 inches

*Control section:* Clay content - 35 to 50 percent; rock fragment content - 15 to 35 percent, mainly pebbles; depth to paralithic contact - 20 to 40 inches; reaction - slightly acid to mildly alkaline

*A horizon:* Value - 4 or 5 dry, 2 to 4 moist; chroma - 1 to 3

*Bt horizon:* Hue - upper part is 10YR or 7.5YR, lower part is 10YR or 2.5Y; value - upper part is 4 or 5 dry and 3 or 4 moist, lower part is 5 to 7 dry and 2 to 5 moist; chroma - 2 to 5; texture - gravelly clay loam or gravelly clay; rock fragment content - 15 to 35 percent, mainly pebbles (in some pedons the lower part is 20 to 70 percent pebbles, 5 to 20 percent cobbles, and 1 to 10 percent stones)

### Chalco Series

The Chalco series consists of shallow, well drained soils that formed in basic igneous pedisiment over residuum derived from Tertiary sedimentary rock. These soils are on pediment remnants. Slope is 4 to 50 percent.

**Taxonomic class:** Clayey, montmorillonitic, mesic, shallow Xerollic Haplargids.

**Typical pedon:** A Chalco very cobbly loam, 4 to 15 percent slopes in an area of Chalco-Haar association, lat. 39°23'36" N., long. 119°34'08" W., in sec. 25, T. 18 N., R. 21 E.

**A1**—0 to 2 inches; light brownish gray (10YR 6/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; common medium and fine vesicular pores and few fine tubular pores; 25 percent pebbles and 20 percent cobbles; neutral; abrupt smooth boundary

**A2**—2 to 5 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; few fine tubular pores; 5 percent pebbles and 5 percent cobbles; neutral; abrupt wavy boundary

**Bt1**—5 to 8 inches; brown (10YR 5/3) clay, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure; very hard, firm, sticky and plastic; few coarse and medium roots and common fine and very fine roots; few fine tubular pores; 5 percent pebbles and 5 percent cobbles; continuous thick clay films on ped faces; neutral; clear smooth boundary

**Bt2**—8 to 14 inches; yellowish brown (10YR 5/4) clay, yellowish brown (10YR 5/4) moist; weak medium prismatic structure; very hard, very firm, sticky and very plastic; few medium roots and common fine and very fine roots; few fine tubular pores; 5 percent pebbles; continuous moderately thick and thick clay films on ped faces; neutral; abrupt wavy boundary.

**2Cr**—14 inches; soft waterlaid tuff

#### Range in characteristics

*Profile.* Soil moisture - moist in winter and early in spring, dry in summer and fall; soil temperature - 50 to 52 degrees F; depth to bedrock - 10 to 20 inches

*Control section:* Clay content - 35 to 60 percent; rock fragment content - 0 to 20 percent

*A horizon:* Value - 5 or 6 dry, 3 or 4 moist; chroma - 2 or 3; structure - platy granular or subangular blocky; reaction - slightly acid to mildly alkaline

*Bt horizon:* Value - 4 to 6 dry, 4 or 5 moist; chroma - 3 or 4; clay content - 40 to 60 percent; rock fragment content (average) - 0 to 15 percent; structure - commonly prismatic but angular blocky in some pedons; reaction - slightly acid to moderately alkaline; other features - less than 15 percent sand that is coarser than very fine sand

*C horizon (where present):* Hue - 10YR or 2.5Y; value - 6 or 7 dry, 4 to 6 moist; chroma - 2 to 4

### Chill Series

The Chill series consists of very shallow, well drained soils that formed in residuum derived from granitic rock. These soils are on low hills. Slope is 8 to 30 percent.



**Taxonomic class:** Loamy, mixed, mesic, shallow Xerollic Haplargids.

**Typical pedon:** Chill coarse sand, 8 to 30 percent slopes, at 39°20'32" N, long 119°32'34" W, in sec. 17, T. 17 N., R. 21 E.

- A1—0 to 2 inches, pale brown (10YR 6/3) coarse sand, dark grayish brown (10YR 4/2) moist, single grain, loose, nonsticky and nonplastic, many coarse interstitial pores, 5 percent pebbles and 5 percent cobbles; neutral; abrupt smooth boundary
- A2—2 to 5 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist, moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine roots, common very fine tubular pores and many very fine interstitial pores, 10 percent pebbles, mildly alkaline; abrupt wavy boundary
- Bt—5 to 14 inches, yellowish brown (10YR 5/4) gravelly sandy loam, dark brown (10YR 3/3) moist, strong medium subangular blocky structure, hard, very friable, slightly sticky and slightly plastic; many very fine roots and common fine roots, common very fine and fine tubular pores; continuous thin clay films lining tubular pores and on ped faces, 15 percent pebbles and 5 percent cobbles, mildly alkaline; abrupt wavy boundary
- Cr—14 inches; weathered granitic rock, thick root mats and thin clay films lining fracture planes; hardness increases with increasing depth.

#### Range in characteristics

**Profile:** Soil moisture - usually dry, moist in winter and spring, dry in June to November; soil temperature - 50 to 54 degrees F

**Control section:** Clay content - 18 to 27 percent; sand content - 45 to 66 percent; rock fragment content - 15 to 35 percent, mainly fine pebbles, depth to paralithic contact - 6 to 14 inches, reaction - neutral or mildly alkaline

**A horizon:** Value - 5 or 6 dry, 3 or 4 moist, chroma - 2 or 3; rock fragment content - 0 to 30 percent, mainly fine pebbles

**Bt horizon:** Hue - 10YR or 7.5YR, value - 4 or 5 dry, 3 to 5 moist; chroma - 3 or 4, clay content - 25 to 35 percent

These soils are a taxadjunct to the Chill series because they have 3 to 4 percent less clay in the control section than is defined for the series. This difference, however, does not significantly affect their use and management.

### Cleaver Series

The Cleaver series consists of shallow, well drained soils that formed in alluvium derived from basic igneous rock. These soils are on alluvial fans. Slope is 2 to 30 percent.

**Taxonomic class:** Loamy, mixed, mesic, shallow Typic Durargids.

**Typical pedon:** A Cleaver very gravelly sandy loam, 2 to 15 percent slopes, in an area of Cleaver Slingdorn association, lat. 39°32'03" N, long 119°28'37" W, in sec. 11, T. 19 N., R. 22 E.

- A—0 to 1 inch, pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist, moderate fine granular structure; slightly hard, friable, sticky and plastic, many very fine roots, many very fine interstitial pores; 40 percent pebbles and 10 percent cobbles; moderately alkaline, abrupt smooth boundary
- Bt1—1 to 3 inches, pale brown (10YR 6/3) gravelly sandy clay loam, brown (10YR 4/3) moist, weak fine subangular blocky structure, hard, firm, sticky and plastic, many very fine roots and common fine roots, many very fine and few fine tubular pores, continuous thin clay films as bridges on ped faces and lining pores, 15 percent pebbles and 1 percent cobbles, moderately alkaline, clear smooth boundary.
- Bt2—3 to 11 inches, yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist, moderate medium and fine subangular blocky structure; very hard, firm, very sticky and very plastic; many very fine and medium roots and common fine roots, many very fine and few fine tubular pores, continuous thin clay films as bridges on ped faces and lining pores; 15 percent pebbles and 1 percent cobbles; moderately alkaline; abrupt smooth boundary
- Bqkm—11 to 20 inches, indurated and fractured duripan, massive; brittle, few roots in cracks, strongly effervescent; very strongly alkaline, clear wavy boundary
- Cqk—20 to 32 inches, very pale brown (10YR 7/4) extremely cobbly loamy sand, light yellowish brown (10YR 6/4) moist, massive, very hard, firm, brittle; common medium, fine, and very fine roots; many very fine interstitial pores; continuously weakly cemented by lime and silica; 40 percent pebbles and 40 percent cobbles; strongly effervescent; strongly alkaline; clear wavy boundary
- Ck—32 to 60 inches, very pale brown (10YR 7/3), extremely cobbly sand, pale brown (10YR 6/3) moist, massive, hard, firm, nonsticky and nonplastic; few fine and medium roots and common very fine roots, many very fine interstitial pores; weak continuous cementation by lime; 40 percent pebbles and 40 percent cobbles, strongly effervescent; strongly alkaline

#### Range in characteristics

*Profile:* Soil moisture - usually dry from April to December; soil temperature - 54 to 56 degrees F; depth to hardpan - 10 to 20 inches

*Control section:* Clay content - 25 to 35 percent; rock fragment content - 15 to 35 percent, mainly pebbles

*A horizon:* value - 6 or 7 dry, 4 or 5 moist; chroma - 2 or 3; reaction - neutral; other features - strongly alkaline and strongly calcareous in some pedons where recharge by dust has occurred

*Bt horizon:* Hue - 10YR or 7.5YR; value - 5 or 6 dry, 4 or 5 moist; chroma - 3 to 5; texture - clay loam or light clay in the upper part and sandy loam, fine sandy loam or light clay loam in the lower part; rock fragment content - 15 to 35 percent, mainly pebbles; reaction - neutral to moderately alkaline; other features - some pedons have a transitional Bt horizon of loam, sandy loam or fine sandy loam that is as much as 40 percent pebbles in the lower part in some pedons

## Devada Series

The Devada series consists of shallow, well drained soils that formed in residuum derived from basic igneous rock. These soils are on ridges and back slopes of hills, plateaus, and mountains. Slope is 2 to 50 percent.

**Taxonomic class:** Clayey montmorillonitic, mesic Lithic Argixerolls

**Typical pedon:** A Devada very stony loam, 2 to 8 percent slopes, in an area of Xerla-Devada-Ister association, lat. 39°22'30" N., long. 119°36'45" W., in sec. 3, T. 17 N., R. 21 E.

**A**—0 to 4 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate coarse granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine roots; few fine and many very fine interstitial pores; 5 percent pebbles, 15 percent cobbles and 4 percent stones; neutral, abrupt smooth boundary

**Bt1**—4 to 9 inches; grayish brown (10YR 5/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; strong medium and coarse subangular blocky structure; hard, firm, sticky and plastic; few medium roots and many fine and very fine roots; common fine tubular pores; many thin and moderately thick clay films on ped faces and in pores; 15 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary

**Bt2**—9 to 11 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; strong medium and coarse subangular blocky structure; very hard, very firm, very sticky and very plastic; few medium roots and many fine and very fine roots; few very fine tubular pores; many moderately thick clay films on ped faces and in pores; 15 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary

**Bt3**—11 to 18 inches; yellowish brown (10YR 5/4) clay, brown (10YR 4/3) moist; strong medium and coarse subangular blocky structure; very hard, very firm, very sticky and very plastic; few fine and medium roots; few very fine tubular pores; continuous thick clay films on ped faces and in pores; 10 percent pebbles; neutral; abrupt wavy boundary

**R**—18 inches; hard bedrock

### Range in characteristics

*Profile:* Soil moisture - usually dry, moist in winter and spring, dry in summer to late in fall; soil temperature - 48 to 53 degrees; thickness of mollic epipedon - 7 to 20 inches (includes all or part of the argillic horizon); combined thickness of A and Bt horizons - 12 to 20 inches

*Control section:* Clay content - 40 to 60 percent; rock fragment content - 0 to 30 percent, mainly pebbles; depth to bedrock - 12 to 20 inches; reaction - slightly acid or neutral

*A horizon:* Value - 4 or 5 dry, 2 or 3 moist (some pedons have a thin upper layer with value of 6 dry, but when the upper 7 inches is mixed, value is less than 5.5 dry); chroma - 2 or 3; structure - platy, subangular blocky, granular, or massive

*Bt horizon:* Hue - 7.5YR or 10YR; value - 4 to 6 dry, 3 or 4 moist; chroma - 2 to 4; texture - dominantly clay or gravelly clay, commonly with thin layers of clay loam

## Duco Series

The Duco series consists of shallow, well drained soils that formed in residuum and colluvium weathered dominantly from andesite. These soils are on convex mountain ridges and back slopes. Slope is 15 to 75 percent.

**Taxonomic class:** Loamy-skeletal mixed, mesic Lithic Argixerolls

**Typical pedon:** A Duco very stony sandy loam, 15 to 50 percent slopes, in an area of Duco-Smal cone-Cage association, lat. 39°21'45" N., long. 119°40'21" W., in sec. 6, T. 17 N., R. 21 E.

**A**—0 to 5 inches; grayish brown (10YR 5/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 15 percent pebbles, 15 percent cobbles and 4 percent stones; many thin clay films on ped faces; neutral; clear smooth boundary

**Bt1**—5 to 10 inches; brown (10YR 4/3) very grave y loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; 30 percent pebbles and 10 percent

cobbles; many thin clay films on ped faces, neutral, clear wavy boundary

Bt2—10 to 14 inches: yellowish brown (10YR 5/4) very gravelly clay loam; yellowish brown (10YR 5/4) moist, moderate medium subangular blocky structure; hard firm, sticky and plastic; common very fine and fine roots, common fine tubular pores, 25 percent pebbles and 10 percent cobbles, neutral gradual wavy boundary

Bt3—14 to 18 inches: yellowish brown (10YR 5/4) very gravelly sandy clay loam, yellowish brown (10YR 5/4) moist, moderate medium subangular blocky structure; hard firm, sticky and plastic; common very fine roots and few fine roots, common very fine tubular pores, 25 percent pebbles and 10 percent cobbles; many thin clay films on ped faces, neutral, clear smooth boundary

R—18 inches: andesite weathered in the upper 1 inch

#### Range in characteristics

*Profile.* Soil moisture - usually dry, moist in winter and dry in summer and fall, soil temperature - 50 to 53 degrees F, mollic epipedon thickness - 7 to 20 inches (commonly includes upper part of argillic horizon), combined thickness of A and Bt horizons - 10 to 20 inches, depth to bedrock - 10 to 20 inches, reaction - slightly acid to mildly alkaline

*Control section.* Clay content - 27 to 35 percent; rock fragment content - 35 to 75 percent (25 to 45 percent pebbles 0 to 20 percent cobbles, and 0 to 40 percent stones; stones commonly are in lower part)

*A horizon.* Value - 4 or 5 dry, 2 or 3 moist, chroma - 1 to 3

*Bt1 horizon.* Hue - 10YR or 7.5YR, value - 4 or 5 dry, 2 or 3 moist; chroma - 2 or 3; texture - gravelly or very gravelly loam, sandy clay loam, or clay loam

*Bt2 horizon.* Hue - 10YR or 7.5YR; value - 4 to 6 dry, 2 to 5 moist; chroma - 2 to 4

### Fulstone Series

The Fulstone series consists of shallow, well drained soils that formed in alluvium derived from igneous and metamorphic rock. These soils are on very old dissected alluvial fans. Slope is 2 to 30 percent.

**Taxonomic class:** Cayey montmorillonitic, mesic, shallow Abruptic Xerochic Durargids.

**Typical pedon:** Fulstone cobbly loam, 4 to 30 percent slopes at 39°20'33" N, long. 119°28'34" W, in sec. 14, T 17 N, R 22 E

A1—0 to 2 inches, brown (10YR 5/3) cobbly loam, very dark gray sh brown (10YR 3/2) moist, weak thin platy structure; soft, very friable, nonsticky and nonplastic, many very fine roots, common very fine tubular pores, 15 percent pebbles and 15 percent cobbles, neutral, abrupt smooth boundary

A2—2 to 4 inches, brown (10YR 5/3) fine sandy loam dark brown (10YR 3/3) moist, moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots, common very fine tubular pores; 10 percent pebbles, neutral, abrupt smooth boundary

A3—4 to 5 inches, pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist, moderate very thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots and few fine, medium, and coarse roots; common very fine interstitial pores and few very fine tubular pores; bleached sand grains coating ped faces, 10 percent pebbles, moderately alkaline, abrupt smooth boundary

Bt—5 to 18 inches, dark yellowish brown (10YR 4/4) clay, dark yellowish brown (10YR 4/4) moist, strong medium prismatic structure; very hard, firm, very sticky and very plastic; few very fine roots; continuous pressure faces; 5 percent pebbles and 5 percent cobbles; mildly alkaline, abrupt regular boundary

Bqm—18 to 19 inches, brownish yellow (10YR 6/6) indurated duripan, massive; very hard, very firm; root mats on the upper surface; abrupt wavy boundary

Bqkm—19 to 55 inches or more: indurated duripan with laminar surface, massive, extremely hard, extremely firm, few fine roots in channels, 30 percent pebbles, 20 percent cobbles, and 20 percent stones; strongly effervescent

#### Range in characteristics

*Profile.* Soil moisture - usually dry, moist in winter and spring, dry in summer and early in fall; depth to indurated duripan - 14 to 20 inches

*Control section.* Clay content - 45 to 60 percent

*Bt horizon.* Hue - 7.5YR or 10YR, chroma - 2, 3, or 4, rock fragment content - commonly free of rock fragments, but some pedons have pebbles or cobbles because of mixing by burrowing animals

*Bqkm horizon.* Duripan - essentially continuously cemented, but broken in some places by burrowing animals; rock fragment content below the duripan - 50 to 80 percent pebbles and cobbles; other features - 0 to 40 percent durinodes below the duripan

### Gabica Series

The Gabica series consists of shallow, well drained soils that formed in residuum derived from basalt or other basic igneous rock. These soils are on hills. Slope is 8 to 30 percent.

**Taxonomic class:** Loamy skeletal mixed, frigid Lithic Argixerolls

**Typical pedon:** A Gabica gravelly loam, 8 to 30 percent slopes, in an area of Burnborough-Gabica

association, lat. 39°18'29" N, long. 119°40'34" W, in sec. 30, T. 17 N., R. 21 E.

- A—0 to 5 inches, grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; strong fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine fine and medium roots; many fine interstitial and tubular pores; 15 percent pebbles, neutral; clear smooth boundary
- Bt1—5 to 9 inches, brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine, fine, and medium roots; 50 percent pebbles and 5 percent cobbles, neutral; clear wavy boundary
- Bt2—9 to 15 inches, yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; 45 percent pebbles and 5 percent cobbles, many coarse roots; common very thin clay films on ped faces, neutral; clear regular boundary
- R—15 inches, fractured bedrock, weathered rock seams.

#### Range in characteristics

*Profile:* Soil moisture - moist in winter and spring, dry between depth of 4 inches and bedrock for 45 to 70 consecutive days in midsummer and late in summer; soil temperature - 42 to 47 degrees F, thickness of mollic epipedon - 7 to 19 inches, thickness of A and Bt horizons - 12 to 20 inches

*Control section:* Clay content - 18 to 27 percent; rock fragment content - 50 to 80 percent; depth to bedrock - 12 to 20 inches, reaction - medium acid to neutral

*A horizon:* Value - 4 or 5 dry, 2 or 3 moist, chroma - 2 or 3

*Bt horizon:* Hue - 10YR or 7.5YR; value - 4 or 5 dry, 3 or 4 moist, chroma - 2 to 4, texture - loam, clay loam, or silty clay loam, clay content - 24 to 35 percent; rock fragment content - 50 to 80 percent

### Haar Series

The Haar series consists of very shallow, well drained soils that formed in residuum and colluvium derived from sandstone, siltstone, and diatomite. These soils are on unstable back slopes and rolling hills. Slope is 15 to 50 percent

**Taxonomic class:** Loamy, mixed, nonacid, mesic, shallow Xeric Torriorthents

**Typical pedon:** A Haar loam, 15 to 50 percent slopes, in an area of Chalco-Haar association, lat. 39°23'07" N., long. 119°33'39" W., in sec. 31, T. 18 N., R. 22 E.

- A—0 to 4 inches, white (10YR 8/2) loam, pale brown (10YR 6/3) moist; weak thick platy structure; slightly

hard, friable, nonsticky and nonplastic; few medium roots, common fine roots and many very fine roots; many fine and very fine vesicular and interstitial pores; 50 percent soft mudstone pebbles and 5 percent hard andesite cobbles, neutral; abrupt wavy boundary

Cr—4 inches, soft mudstone; roots in the upper part

#### Range in characteristics

*Profile:* Soil moisture - usually dry, but moist from late in fall to early in spring; soil temperature - 50 to 54 degrees F

*Control section:* Texture - sandy loam, loam, or silty loam; clay content - 10 to 18 percent; rock fragment content - 50 to 90 percent pebbles of soft mudstone, siltstone, and sandstone (most fragments slake in water or crush easily when wet); depth to paranthic contact - 4 to 10 inches, reaction - neutral to moderately alkaline

*A horizon:* Hue - 2.5Y or 10YR; value - 6 to 8 dry, 3 to 6 moist; chroma - 2 or 3; structure - granular or platy; rock fragment content - as much as 30 percent hard rock fragments from higher lying geologic formations

*C horizon (where present):* Hue - 2.5Y or 10YR; value - 6 or 7 dry, 3 to 5 moist, chroma - 2 or 3

### Hefed Series

The Hefed series consists of very deep, well drained soils that formed in colluvium derived from basic igneous rock. These soils are on mountain back slopes. Slope is 30 to 75 percent

**Taxonomic class:** Loamy-skeletal mixed, mesic Xerollic Haplargids

**Typical pedon:** A Hefed very stony sandy loam, 50 to 75 percent slopes, in an area of Old Camp-Hefed-Rock outcrop association, lat. 39°32'11" N., long. 119°21'42" W., in sec. 27, T. 20 N., R. 23 E.

- A—0 to 2 inches, brown (10YR 5/3) very stony sandy loam, dark brown (10YR 3/3) moist; weak medium platy structure; slightly hard, very friable, nonsticky and nonplastic; few fine roots and common very fine roots; few fine and many very fine vesicular pores; 35 percent pebbles, 20 percent cobbles, and 5 percent stones, neutral; abrupt smooth boundary
- Bt—2 to 14 inches, yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; moderate medium and fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few coarse roots and many medium, fine, and very fine roots; few medium, common fine, and many very fine tubular pores; few thin and many very thin clay films on ped faces and in pores; 30 percent pebbles, 15 percent cobbles, and 1 percent stones, neutral; clear wavy boundary

- C1**—14 to 25 inches, pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few coarse roots, common medium and fine roots, and many very fine roots; few fine and many very fine tubular pores; 30 percent pebbles, 25 percent cobbles, and 1 percent stones; neutral; gradual wavy boundary
- C2**—25 to 46 inches, pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few medium roots, common fine roots, and many very fine roots; few fine and many very fine tubular pores; 30 percent pebbles, 20 percent cobbles, and 1 percent stones; moderately alkaline, slightly effervescent; clear wavy boundary
- Cqk**—46 to 65 inches, pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 4/3) moist; massive; hard brittle nonsticky and nonplastic; few fine and common very fine roots, common fine and many very fine tubular pores; 35 percent pebbles, 25 percent cobbles, and 1 percent stones; continuous weak silica cementation with few krotovinas; moderately alkaline; strongly effervescent; clear wavy boundary
- Ck'**—65 to 72 inches, pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 4/3) moist; massive; few fine and very fine roots; many very fine interstitial pores; 20 percent pebbles, 5 percent cobbles, and 1 percent stones; moderately alkaline; strongly effervescent

#### Range in characteristics

*Profile.* Soil moisture - usually dry in summer and fall, moist in winter and spring; soil temperature - 52 to 55 degrees F

*Control section.* Clay content - 18 to 27 percent; rock fragment content - 35 to 50 percent; depth to bedrock - more than 60 inches

*A horizon:* Value - 5 or 6 dry, 3 or 4 moist; chroma - 2 or 3; reaction - neutral or mildly alkaline

*Bt horizon:* Hue - 10YR or 7.5YR; value - 5 or 6 dry, 3 or 4 moist; chroma - 3 or 4; texture - loam or sandy loam; rock fragment content - 35 to 50 percent; reaction - neutral to moderately alkaline

*C horizon:* Value - 5 or 6 dry, 3 or 4 moist; chroma - 3 or 4; texture - sandy loam or loamy sand; rock fragment content - 40 to 60 percent (some horizons range from 20 to 80 percent); reaction - neutral to moderately alkaline; effervescence - moderately effervescent or strongly effervescent in the lower part; other features - some pedons do not have a weakly silica- and lime-cemented horizon

### Hunewill Series

The Hunewill series consists of very deep, well drained soils that formed in alluvium derived from various kinds

of rock. These soils are on alluvial fans and stream terraces. Slope is 2 to 15 percent

**Taxonomic class:** Loamy-skeletal, mixed, mesic Xerollic Haplargids

**Typical pedon:** Hunewill very gravelly sandy loam, 4 to 15 percent slopes, lat. 39°30'33" N., long. 119°38'26" W., sec. 16, T. 19 N., R. 21 E

**A1**—0 to 2 inches, grayish brown (10YR 5/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots, common fine and very fine tubular pores; 40 percent pebbles; neutral abrupt smooth boundary

**A2**—2 to 5 inches, pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots, common very fine tubular pores; 30 percent pebbles; neutral, clear smooth boundary

**B11**—5 to 11 inches, light yellowish brown (10YR 6/4) very gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common very fine and fine roots; common fine and very fine tubular pores; 40 percent pebbles; common thin and very thin clay films on ped faces and in pores; neutral, clear smooth boundary

**B12**—11 to 18 inches, pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; common very fine tubular pores; common very thin clay coatings and bridges on sand grains; 45 percent pebbles and 5 percent cobbles; neutral; clear smooth boundary

**2C**—18 to 65 inches, pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 60 percent pebbles and 5 percent cobbles; neutral

#### Range in characteristics

*Profile.* Soil moisture - moist in winter and spring, dry in summer and fall; soil temperature - 50 to 53 degrees F

*Control section:* Clay content - 18 to 27 percent; rock fragment content - 35 to 50 percent; combined thickness of A and Bt horizons - 10 to 20 inches; other features - darker value when dry reflects primary lithochromic colors

*A horizon:* Value - 5 or 6 dry, 3 or 4 moist; chroma - 2 or 3

*Bt1 horizon:* Hue - 10YR or 7.5YR; value - 4 to 6 dry, 3 or 4 moist; chroma - 3 or 4; texture - loam, sandy

clay loam or clay loam; rock fragment content - 35 to 50 percent

*Bt2 horizon* Texture - loam or sandy loam; rock fragment content - 35 to 50 percent

*2C horizon* Value - 5 or 6 dry, 3 or 4 moist, chroma - 2 or 3; texture - extremely gravelly or cobbly sand or loamy sand; rock fragment content - 60 to 70 percent rounded pebbles and cobbles; other features - few very thin lime coatings on bottom of larger cobbles in some pedons

## Indiano Series

The Indiano series consists of moderately deep, well drained soils that formed in residuum and colluvium derived from altered rhyolitic rock and other volcanic rock. These soils are on hills. Slope is 15 to 50 percent.

**Taxonomic class:** Fine-loamy, mixed, mesic Aridic Argixerols

**Typical pedon:** An Indiano stony sandy loam, 30 to 50 percent slopes, in an area of Indiano-Devada association, lat. 39°20'16"N, long. 119°38'11"W, in sec. 16 T 17 N, R 21 E

A1—0 to 6 inches; grayish brown (10YR 5/2) stony sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine, fine and medium roots; many very fine and fine tubular pores; 15 percent pebbles and 2 percent stones; neutral; clear smooth boundary

A2—6 to 13 inches; grayish brown (10YR 5/2) cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; strong fine subangular blocky structure, slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, medium, and coarse roots; many very fine tubular and interstitial pores; 15 percent pebbles and 15 percent cobbles; neutral; clear smooth boundary

AB—13 to 16 inches; pale brown (10YR 6/3) cobbly sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; common thin clay films as bridges and lining pores; 10 percent pebbles and 15 percent cobbles; neutral; clear smooth boundary

Bt1—16 to 26 inches; light yellowish brown (10YR 6/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; common thin clay films as bridges and lining pores; 20 percent pebbles and 10 percent cobbles; neutral; clear wavy boundary

Bt2—26 to 36 inches; brown (10YR 5/3) very cobbly sandy clay loam, dark yellowish brown (10YR 3/4)

moist; weak medium and coarse subangular blocky structure; hard, friable, sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; 20 percent pebbles and 15 percent cobbles; neutral; abrupt wavy boundary

2R—36 inches; unweathered rhyolite.

### Range in characteristics

**Profile** Soil moisture - usually dry, moist in winter and spring; soil temperature - 47 to 54 degrees F; mollic epipedon thickness - 7 to 14 inches; depth to bedrock - 20 to 40 inches; other features - bedrock is altered volcanic rock that commonly is weathered in the upper 1 inch to 4 inches

**Control section:** Clay content (average) - 20 to 35 percent; rock fragment content - 10 to 35 percent pebbles and cobbles; reaction - slightly acid or neutral

*A horizon:* Hue - 10YR or 7.5YR, value - 4 or 5 dry, 2 or 3 moist, chroma - 2 or 3

*Bt horizon:* Hue - 10YR or 7.5YR, value - 5 or 6 dry, 4 or 5 moist; chroma - 3 or 4; texture - clay loam, loam, sandy clay loam, or gravelly or cobbly clay loam or sandy clay loam; structure - weak and prismatic, weak to moderate and subangular blocky or massive

## Isolde Series

The Isolde series consists of very deep, excessively drained soils that formed in eolian sand derived from various kinds of rock. These soils are in areas of stabilized dunes and hummocks on stream terraces. Slope is 4 to 15 percent.

**Taxonomic class:** Mixed, mesic Typic Torripsamments

**Typical pedon:** An Isolde fine sand, 4 to 15 percent slopes, in an area of Saralegu-Isolde association, at 39°33'24" N, long. 119°32'17" W, in sec. 32, T 20 N, R 20 E

A1—0 to 3 inches; grayish brown (10YR 5/2), fine sand dark grayish brown (10YR 4/2) moist; single grain, loose, nonsticky and nonplastic; many fine and very fine interstitial pores; neutral; clear smooth boundary

C1—3 to 11 inches; pale brown (10YR 6/3) fine sand brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few medium roots; common fine roots; and many very fine roots; many fine and very fine interstitial pores; neutral; clear smooth boundary

C2—11 to 23 inches; pale brown (10YR 6/3) fine sand brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common coarse, medium fine, and very fine roots; many fine and very fine interstitial pores; neutral; gradual smooth boundary

C3—23 to 60 inches; pale brown (10YR 6/3) fine sand brown (10YR 4/3) moist; massive; soft, very friable,

nonsticky and nonplastic; few coarse, medium, and fine roots and common very fine roots, many fine and very fine interstitial pores; neutral

#### Range in characteristics

*Profile.* Soil moisture - moist in December to March, dry the rest of the year; soil temperature - 53 to 57 degrees F

*Control section.* Texture - commonly fine sand or sand but in some pedons it is sand (50 to 80 percent passes the number 40 sieve and 1 to 10 percent passes the number 200 sieve); reaction - neutral to moderately alkaline

*A horizon.* Hue - 10YR or 2.5Y; value - 5 to 7 dry, 4 or 5 moist; chroma - 2 or 3

*C horizon.* Hue - 10YR or 2.5Y; value - 6 or 7 dry, 4 or 5 moist; chroma - 2 or 3; other features - some pedons have a 2C horizon below a depth of 40 inches, in some pedons the lower part of the C horizon is moderately alkaline or strongly alkaline and noneffervescent to strongly effervescent

### Ister Series

The Ister series consists of moderately deep, well drained soils that formed in residuum and colluvium derived mainly from andesite. These soils are on the sides of mountains and hills. Slope is 30 to 50 percent.

**Taxonomic class:** Loamy-skeletal, mixed, mesic Andic Argixerols.

**Typical pedon:** An Ister very stony sandy loam, 30 to 50 percent slopes, in an area of Olac-Old Camp-Ister association, lat 39°27'10" N, long. 119°26'23" W, in sec 6, T 18 N, R. 23 E.

**A1**—0 to 4 inches, grayish brown (10YR 5/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist, weak coarse granular structure, slightly hard, very friable, nonsticky and nonplastic; few fine roots and many very fine roots, many fine and very fine interstitial pores, 20 percent pebbles, 25 percent cobbles, and 10 percent stones; neutral; clear smooth boundary

**A2**—4 to 7 inches, brown (10YR 4/3) very stony sandy loam, very dark brown (10YR 2/2) moist, weak medium and fine granular structure; soft, very friable, slightly sticky and nonplastic; common medium and fine roots and many very fine roots, common fine and very fine tubular and interstitial pores; 20 percent pebbles, 10 percent cobbles, and 15 percent stones; neutral; clear smooth boundary

**Bt1**—7 to 11 inches, brown (10YR 5/3) very stony sandy clay loam, dark brown (10YR 3/3) moist, moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common coarse and medium roots and many fine and very fine roots, many fine and very fine tubular pores, common thin and very thin clay bridges and coatings

on ped faces and sand grains and in pores; 20 percent pebbles, 10 percent cobbles, and 15 percent stones; neutral; gradual wavy boundary

**Bt2**—11 to 16 inches, yellowish brown (10YR 5/4) very stony clay loam, dark yellowish brown (10YR 3/4) moist, moderate medium and coarse subangular blocky structure; hard, friable, sticky and plastic; common coarse, medium, fine and very fine roots, few medium and fine tubular pores and common very fine tubular pores; continuous thin clay films on ped faces and in pores; 20 percent pebbles, 10 percent cobbles, and 15 percent stones; neutral; gradual wavy boundary

**Bt3**—16 to 25 inches, yellowish brown (10YR 5/4) very stony clay loam, dark yellowish brown (10YR 3/4) moist, moderate medium and coarse subangular blocky structure; hard, friable, sticky and plastic; few coarse and medium roots and common fine and very fine roots, few medium and fine tubular pores and common very fine tubular pores; continuous thin clay films on ped faces and in pores; 20 percent pebbles, 10 percent cobbles, and 15 percent stones; neutral; abrupt wavy boundary

**R**—25 inches; fractured andesite, clay coatings in fractures

#### Range in characteristics

*Profile.* Soil moisture - usually dry, moist in winter and spring, dry from mid-June to October; soil temperature - 47 to 52 degrees F; moisture epipedon thickness - 10 to 18 inches (includes upper part of argillic horizon in some pedons); combined thickness of A and Bt horizons - 25 to 40 inches

*Control section.* Clay content - 25 to 35 percent; rock fragment content - 35 to 50 percent, mainly stones; depth to bedrock - 25 to 40 inches; reaction - neutral or mildly alkaline

*A horizon:* Value - 3 to 5 dry, 2 or 3 moist; chroma - 2 or 3; rock fragment content - 50 to 80 percent, mainly cobbles and stones

*Bt1 horizon:* Value - 5 to 6 dry, 3 or 4 moist; chroma - 3 or 4

*Bt2 and Bt3 horizons:* Value - 5 to 7 dry, 3 to 5 moist; chroma - 3 to 6; texture - commonly very stony clay loam or very stony sandy clay loam, but some pedons have very stony clay layers

### Lapon Series

The Lapon series consists of very shallow, well drained soils that formed in residuum and colluvium derived from basic igneous rock with a component of ashy loess. These soils are on plateaus, hill pediments, mountain terraces, and upper side slopes. Slope is 4 to 50 percent.

**Taxonomic class:** Loamy-skeletal, mixed, mesic, shallow Xerollic Durargids.



**Typical pedon:** A Lapon very stony loam, 30 to 50 percent slopes, in an area of Theon-Lapon-Olac association at 39°24'58" N., long. 119°25'38" W., in sec. 20 T. 18 N. R. 23 E.

A—0 to 3 inches: light brownish gray (10YR 6/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine vesicular pores; 30 percent pebbles, 20 percent cobbles, and 10 percent stones; neutral; abrupt smooth boundary

Bt1—3 to 6 inches, dark yellowish brown (10YR 4/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; many very fine roots and few medium roots; common very fine tubular pores; continuous thin to moderately thick clay films on ped faces and lining pores; 35 percent pebbles and 10 percent cobbles; neutral; clear wavy boundary

Bt2—6 to 12 inches, dark yellowish brown (10YR 4/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine and fine roots; common very fine tubular pores; continuous thin to moderately thick clay films on ped faces and lining pores; 35 percent pebbles and 10 percent cobbles; neutral; abrupt wavy boundary

Bqm—12 to 15 inches, silica-indurated duripan.

R—15 inches: hard andesite

#### Range in characteristics

**Profile:** Soil moisture - moist in winter and spring, dry in summer and fall; soil temperature - 52 to 55 degrees F; depth to duripan - 8 to 14 inches; other features - duripan is indurated in the upper 1 to 10 inches and is strongly cemented in the lower part in some pedons where depth to bedrock exceeds 20 inches; duripan is not effervescent in some pedons

**Control section:** Clay content - 27 to 35 percent; rock fragment content - 35 to 60 percent, mainly pebbles; depth to bedrock - 10 to 40 inches

**A horizon:** Value - 5 or 6 dry, 3 or 4 moist; chroma - 1 to 3; reaction - neutral or mildly alkaline

**Bt horizon:** Hue - 10YR or 7.5YR; value - 4 to 6 dry, 4 or 5 moist; chroma - 2 to 4; clay content - 25 to 40 percent in any single layer; reaction - neutral or mildly alkaline in the Bt1 and Bt2 horizons, moderately alkaline or strongly alkaline in the Btkg horizon

### Loomer Series

The Loomer series consists of shallow, well drained soils that formed in residuum and colluvium derived from andesite. These soils are on ridges and convex back

slopes of hills. Slope is 15 to 30 percent. Slopes face mainly north and east.

**Taxonomic class:** Clayey skeletal, montmorillonitic, mesic Lithic Argixerolls.

**Typical pedon:** A Loomer extremely cobbly loam, 15 to 30 percent slopes, in an area of Loomer-Zephon-Olac association, lat. 39°29'15" N., long. 119°24'14" W., in sec. 28, T. 19 N. R. 23 E.

A—0 to 4 inches, dark grayish brown (10YR 4/2) extremely cobbly loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; common fine roots and many very fine roots; many fine and very fine interstitial pores; 30 percent pebbles and 30 percent cobbles; neutral; clear smooth boundary

Bt1—4 to 9 inches; brown (10YR 5/3) extremely cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; few coarse and medium roots and common fine and very fine roots; few medium and fine tubular pores and common very fine tubular pores; 35 percent pebbles, 25 percent cobbles, and 2 percent stones; continuous thin and moderately thick clay films on ped faces and in pores; neutral; clear wavy boundary

Bt2—9 to 15 inches, dark yellowish brown (10YR 4/4) extremely cobbly clay, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; very hard, very firm, very sticky and very plastic; few medium and fine roots and common very fine roots; few fine and common very fine tubular pores; 40 percent pebbles and 25 percent cobbles; continuous thin and moderately thick clay films on ped faces and in pores; neutral; abrupt wavy boundary

R—15 inches, andesite; weathered in upper 1 inch to 2 inches

#### Range in characteristics

**Profile:** Soil moisture - moisture in fall to spring, dry from summer to early in fall; soil temperature - 47 to 52 degrees F; thickness of mollic epipedon - 7 to 9 inches (if mixed, the upper 7 inches has value of less than 5.5 dry and 3.5 moist and chroma of less than 3.5 moist); depth to bedrock - 14 to 20 inches

**Control section:** Clay content - 35 to 50 percent; rock fragment content - 60 to 80 percent, mostly angular pebbles and cobbles; reaction - neutral or mildly alkaline; other features - upper part of bedrock commonly is fractured

**A horizon:** Value - 4 or 5 dry, 2 or 3 moist; chroma - 2 or 3; structure - granular or platy

**Bt1 horizon:** Hue - 10YR or 7.5YR; value - 4 or 5 dry, 3 or 4 moist; chroma - 2 or 3; rock fragment content - 50 to 70 percent, mainly pebbles or cobbles



*Bt2 and Bt3 horizons.* Hue - 10YR, 7.5YR, or 5YR, value - 4 to 6 dry, 3 or 4 moist; chroma - 3 or 4, texture - extremely gravelly or extremely cobbly clay loam or clay; clay content - 35 to 50 percent; rock fragment content - 60 to 80 percent, mainly angular pebbles and cobbles.

## Manogue Series

The Manogue series consists of deep, well drained soils that formed in a colluvium and residuum derived from basic igneous rock. These soils are on plateaus and pediments. Slope is 2 to 15 percent.

**Taxonomic class:** Fine, montmorillonitic, mesic Entic Chromoxererts.

**Typical pedon:** Manogue very stony clay, 2 to 15 percent slopes, lat. 39°27'04" N., long. 119°33'35" W., in sec. 6 T. 18 N., R. 22 E.

- A1—0 to 3 inches, brown (10YR 5/3) very stony clay dark brown (10YR 4/3) moist; weak fine granular structure; hard, very firm, very sticky and very plastic; many very fine roots; few fine and very fine tubular pores; 5 percent pebbles, 40 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.
- Bw1—3 to 12 inches, brown (10YR 4/3) cobbly clay brown (10YR 4/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; very hard, very firm, very sticky and very plastic; few fine roots and common very fine roots; few fine and very fine tubular pores; continuous slickensides on ped faces; 5 percent pebbles, 15 percent cobbles, and 10 percent stones; mildly alkaline; clear wavy boundary.
- Bk1—12 to 25 inches, dark yellowish brown (10YR 4/4) clay dark yellowish brown (10YR 4/4) moist; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; few fine roots and common very fine roots; few fine and very fine tubular pores; continuous slickensides on ped faces; less than 5 percent pebbles; slightly effervescent; moderately alkaline; gradual wavy boundary.
- Bk2—25 to 41 inches, brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; very hard, very firm, very sticky and very plastic; few fine and very fine roots; few fine and very fine tubular pores; continuous slickensides on ped faces; less than 5 percent pebbles; slightly effervescent; moderately alkaline; gradual wavy boundary.
- Bk3—41 to 63 inches, brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; massive, very hard, very firm, very sticky and very plastic; few fine and very fine roots; few fine and very fine tubular pores; segregated soft lime blotches; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr—63 inches; weathered andesite impregnated with lime.

### Range in characteristics

**Profile:** Soil moisture - moist in winter and spring, dry in summer and fall; soil temperature - 50 to 52 degrees F., depth to bedrock - 40 to 80 inches.

**Control section:** Clay content - 40 to 55 percent.

**A horizon:** Value - 3 to 5 dry, 3 or 4 moist; chroma - 3 or 4; reaction - slightly acid to moderately alkaline.

**Bw and Bk horizons:** Hue - 10YR or 7.5YR; value - 4 to 6 dry, 3 or 4 moist; chroma - 2 to 4; texture - clay or silty clay; reaction - mildly alkaline or moderately alkaline; depth to carbonates - 10 to 20 inches.

## Mizel Series

The Mizel series consists of very shallow well drained soils that formed in residuum derived from rhyolite. These soils are on hills. Slope is 15 to 50 percent.

**Taxonomic class:** Loamy-skeletal, mixed, nonacid, mesic Lithic Tororthents.

**Typical pedon:** A Mizel very gravelly coarse sandy loam, 15 to 50 percent slopes, in an area of Xman-Zephan-Mizel association, lat. 39°26'41" N., long. 119°37'22" W., in sec. 9, T. 18 N., R. 21 E.

- A1—0 to 3 inches, light brownish gray (10YR 6/2) very gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; common very fine roots and few medium roots; many very fine interstitial pores; 55 percent pebbles; slightly acid; clear smooth boundary.
- A2—3 to 8 inches, pale brown (10YR 6/2) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine tubular pores and common fine and medium interstitial pores; 40 percent pebbles; slightly acid; abrupt smooth boundary.
- R—8 inches, welded rhyolitic tuff.

### Range in characteristics

**Profile:** Soil moisture - moist in winter and early in spring, dry the rest of the year; soil temperature - 50 to 54 degrees F., depth to bedrock - 3 to 10 inches.

**Control section:** Clay content - 5 to 15 percent; rock fragment content (average) - 40 to 60 percent pebbles; texture (average) - very gravelly sandy loam, very gravelly loam, or very gravelly fine sandy loam; reaction - medium acid or slightly acid.

**A horizon:** Value - 6 to 8 dry, 4 to 6 moist; chroma - 2 to 6.

## Nosrac Series

The Nosrac series consists of very deep, well drained soils that formed in colluvium and residuum derived from andesite and schist. These soils are on hills and mountains. Slope is 30 to 50 percent.

**Taxonomic class:** Loamy skeletal, mixed, mesic Andic Argixerolls.

**Typical pedon:** A Nosrac stony fine sandy loam, 30 to 50 percent slopes, in an area of Oppio-Nosrac association, lat. 39°19'17" N., long. 119°37'04" W., in sec. 22, T. 17 N., R. 21 E.

O—2 inches to 0; pine needle duff

A—0 to 6 inches, grayish brown (10YR 5/2) stony fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine to medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and fine interstitial pores; 20 percent pebbles, 30 percent cobbles, and 1 percent stones; neutral; clear smooth boundary

Bt1—6 to 10 inches, brown (10YR 4/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine fine, medium and coarse roots; common very fine and fine interstitial pores; many very thin clay films occurring as bridges between mineral grains and as stains on mineral grains; 35 percent pebbles, 10 percent cobbles, and 2 percent stones; neutral; clear wavy boundary

Bt2—10 to 15 inches, brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; many fine, medium, and coarse roots; common very fine interstitial pores and few fine and medium interstitial pores; few thin clay films on ped faces and lining pores and many very thin clay films occurring as bridges between mineral grains; 35 percent pebbles, 10 percent cobbles, and 2 percent stones; neutral; clear wavy boundary

Bt3—15 to 29 inches, yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and coarse subangular blocky structure; very hard, firm, sticky and plastic; common very fine and fine roots and few medium and coarse roots; common very fine and fine interstitial pores and few medium interstitial pores; continuous thin to moderately thick clay films on ped faces and lining pores; 25 percent pebbles, 10 percent cobbles, and 2 percent stones; neutral; clear wavy boundary

Bt4—29 to 52 inches, yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and coarse subangular blocky structure; very hard, firm, sticky and plastic; few very fine and fine roots; few very fine and fine interstitial pores; continuous thin to moderately thick

clay films on ped faces and lining pores; 25 percent pebbles, 10 percent cobbles, and 2 percent stones; neutral; clear wavy boundary

Bt5—52 to 65 inches, light yellowish brown (10YR 6/4) extremely gravelly loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine interstitial pores; common very thin thin, and moderately thick clay films lining pores; 50 percent pebbles and 10 percent cobbles

### Range in characteristics

**Profile:** Soil moisture - usually moist, dry late in summer and in fall; soil temperature - 47 to 50 degrees F; mollic epipedon thickness - 14 to 20 inches; combined thickness of A and Bt horizons - more than 50 inches; depth to bedrock - 60 to 80 inches

**Control section:** Clay content - 25 to 35 percent; rock fragment content - 35 to 60 percent (30 to 50 percent pebbles and 5 to 15 percent highly weathered cobbles and stones)

**A horizon:** Value - 4 or 5 dry, 2 or 3 moist; chroma - 1 to 3; reaction - slightly acid or neutral

**Bt horizon:** Value - 4 to 6 dry, 3 or 4 moist; chroma - 2 to 4; structure - weak or moderate fine to coarse, subangular blocky or massive; texture - very gravelly loam or very gravelly clay loam

## Oiac Series

The Oiac series consists of shallow, well drained soils that formed in colluvium and residuum derived from andesite. These soils are on hills and mountains. Slope is 4 to 75 percent.

**Taxonomic class:** Loamy-skeletal, mixed, mesic Lithic Xerollic Haplargids

**Typical pedon:** An Oiac very stony loam, 30 to 50 percent slopes, in an area of Oiac-Cagle-Oppio association, lat. 39°31'00" N., long. 118°21'38" W., in sec. 14, T. 19 N., R. 23 E.

A1—0 to 2 inches, grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots and few fine roots; many very fine and fine interstitial pores; 40 percent pebbles, 10 percent cobbles, and 5 percent stones; neutral; clear smooth boundary

A2—2 to 5 inches, grayish brown (10YR 5/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and fine interstitial pores; 40 percent pebbles and 1 percent cobbles; neutral; abrupt wavy boundary

**Bt**—5 to 10 inches: brown (10YR 4/3) extremely gravelly clay loam, dark yellowish brown (10YR 3/4) moist, moderate fine subangular blocky structure; hard, firm, sticky and plastic, common very fine and fine roots, many medium roots, and common coarse roots, many very fine and few fine tubular pores, 60 percent pebbles, many thin and very thin clay films and few moderately thick clay films on ped faces and in pores, neutral, abrupt wavy boundary

**R**—10 inches: fractured andesite, clay in fractures.

#### Range in characteristics

*Profile:* Soil moisture - usually dry in summer and fall, moist from November to early in June; combined thickness of the A and Bt horizons - 8 to 14 inches, depth to bedrock - 8 to 14 inches

*Control section:* Clay content - 18 to 27 percent; rock fragment content - 35 to 60 percent (mainly angular pebbles, 0 to 30 percent cobbles or stones in the upper part), reaction - slightly acid to mildly alkaline

*A horizon:* Value - 5 or 6 dry, 3 or 4 moist, chroma - 2 or 3; rock fragment content - 20 to 60 percent, structure - weak to strong and granular or platy

*Bt horizon:* Hue - 10YR or 7.5YR, value - 4 to 7 dry, 3 or 4 moist, chroma - 2 to 4, texture - extremely gravelly loam or extremely gravelly clay loam; clay content - 23 to 30 percent; rock fragment content - 60 to 75 percent, mainly pebbles

### Old Camp Series

The Old Camp series consists of shallow, well drained soils that formed in residuum and colluvium weathered from basalt, andesite, and tuff. These soils are on hills, mountains, and plateaus. Slope is 4 to 75 percent.

**Taxonomic class:** Loamy-skeletal, mixed, mesic Lithic Xeroch Haplargids

**Typical pedon:** An Old Camp stony loam, 15 to 50 percent slopes, in an area of Olac-Old Camp-Rock outcrop association, lat. 39°27'59" N., long. 119°41'27" W., in sec. 36 T. 19 N., R. 20 E.

**A**—0 to 2 inches, grayish brown (10YR 5/2) very stony loam, dark brown (10YR 3/3) moist, weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots, many very fine tubular and interstitial pores, 30 percent pebbles, 15 percent cobbles, and 10 percent stones, neutral, clear wavy boundary

**Bt1**—2 to 9 inches, brown (7.5YR 5/4) cobbly clay loam, dark brown (7.5YR 4/4) moist, moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots and many fine roots, many very fine tubular pores; many thin and few moderately thick clay films on ped faces and lining pores, 10 percent pebbles, 20 percent cobbles, and 2 percent stones; neutral, clear wavy boundary

**Bt2**—9 to 19 inches, brown (7.5YR 5/4) very cobbly clay loam, dark brown (7.5YR 4/4) moist, weak fine subangular blocky structure; hard, firm, sticky and plastic, common very fine roots and many fine roots; few very fine tubular pores, clay films occurring as coatings and bridges, 20 percent pebbles, 35 percent cobbles, and 2 percent stones; few to almost continuous lime and silica coatings on rock fragments, neutral, abrupt irregular boundary

**R**—19 inches, basalt

#### Range in characteristics

*Profile:* Soil moisture - usually dry, moist in November to May; soil temperature - 47 to 50 degrees F

*Control section:* Rock fragment content - 50 to 75 percent, dominantly cobbles and stones (upper part has 35 to 50 percent rock fragments in some pedons) depth to bedrock - 10 to 20 inches

*A horizon:* Value - 5 to 7 dry, 3 or 4 moist, chroma - 2 or 3, structure - weak granular or platy or massive; reaction - neutral or mildly alkaline

*B horizon:* Hue - 10YR or 7.5YR, value - 5 to 7 dry, 3 to 5 moist, chroma - 2 to 4, texture - clay loam or sandy clay loam but in some pedons are layers of heavy loam modified by an average of 50 to 75 percent rock fragments, clay content - 27 to 35 percent, structure - weak or moderate, coarse to fine, and subangular blocky; reaction - neutral or mildly alkaline in the upper part, ranges to moderately alkaline or strongly alkaline in the calcareous lower part, other features - few to continuous lime coatings on rock fragments or bedrock

### Oppio Series

The Oppio series consists of moderately deep, well drained soils that formed in material weathered from basic volcanic rock. These soils are on hills and plateaus. Slope is 4 to 50 percent.

**Taxonomic class:** Fine, montmorillonitic, mesic Xerollic Haplargids

**Typical pedon:** An Oppio very stony loam, 4 to 15 percent slopes, in an area of Oppio-Reywat-ndiano association, lat. 39°23'35" N., long. 119°38'33" W., in sec. 29, T. 18 N., R. 21 E.

**A**—0 to 2 inches, grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist, weak thick platy structure; hard, friable, slightly sticky and slightly plastic; many very fine roots, few fine interstitial pores, 5 percent pebbles, 5 percent cobbles, and 3 percent stones; mildly alkaline, clear smooth boundary

**Bt1**—2 to 5 inches, grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist, strong medium angular blocky structure, very hard, firm, sticky and plastic, many very fine and fine roots

common fine tubular pores, 5 percent pebbles and 5 percent cobbles. mildly alkaline, clear wavy boundary.

**Bt2**—5 to 16 inches, grayish brown (10YR 5/2) gravelly clay, dark brown (10YR 4/3) moist; strong coarse prismatic structure, extremely hard, very firm, very sticky and very plastic; common very fine roots and few fine roots; few fine tubular pores, 25 percent pebbles and 5 percent cobbles; many moderately thick clay films on ped faces and in pores, mildly alkaline; gradual wavy boundary.

**Bt3**—16 to 26 inches, dark brown (10YR 4/3) gravelly clay, dark brown (10YR 4/3) moist; strong coarse prismatic structure, extremely hard, very firm, very sticky and very plastic; few very fine roots, very few fine tubular pores, 25 percent pebbles and 5 percent cobbles; many thin clay films on ped faces and in pores; slightly effervescent in spots, mildly alkaline; abrupt smooth boundary.

**R**—26 inches; fractured, unweathered bedrock.

#### Range in characteristics

*Profile:* Soil moisture - moist in winter and spring, dry in summer and fall; soil temperature - 47 to 53 degrees F.

*Control section:* Clay content - 35 to 50 percent, rock fragment content - 5 to 35 percent pebbles and as much as 5 percent cobbles, depth to bedrock - typically 20 to 30 inches but in some pedons it is as much as 40 inches, reaction - mildly alkaline to medium acid; other features - bedrock is weathered and fractured in most pedons but cannot be dug with hand tools.

*A horizon:* Value - 5 or 6 dry, 3 or 4 moist; chroma - 2 or 3.

*Bt horizon:* Hue - 10YR or 7.5YR, value - 4 to 6 dry, 3 or 4 moist; chroma - dominantly 3 or 4, but 2 in the upper part in some pedons; texture - clay, clay loam, or sandy clay; rock fragment content - 5 to 35 percent pebbles and as much as 5 percent cobbles.

### Patna Series

The Patna series consists of very deep, somewhat excessively drained soils that formed in wind-worked lacustrine deposits. These soils are on lake terraces and stabilized dunes. Slope is 2 to 15 percent.

**Taxonomic class:** Coarse loamy, mixed, mesic Typic Hap Argids.

**Typical pedon:** A Patna sand, 2 to 15 percent slopes, in an area of Patna-Badland association, lat. 39°33'37" N, long. 118°30'27" W, in sec. 34, T. 20 N., R. 22 E.

**A**—0 to 7 inches, grayish brown (10YR 5/2) sand, dark brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; few medium and fine roots and common very fine roots; many very fine interstitial pores; neutral; abrupt wavy boundary.

**Bt1**—7 to 13 inches, yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 4/4) moist,

moderate medium subangular blocky structure; soft with hard lamellae, very friable, slightly sticky and nonplastic; common medium and fine roots and many very fine roots; few fine tubular pores and many very fine interstitial pores; continuous thin and moderately thick clay films and bridges in 3- to 15-millimeter thick clay lamellae and common very thin bridges in interlamellae; neutral; clear wavy boundary.

**Bt2**—13 to 20 inches, yellowish brown (10YR 5/4) sandy loam, lamellae and loamy sand or sand interlamellae, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure, soft, very friable, nonsticky and nonplastic; few fine roots and common very fine roots; many very fine interstitial pores; common thin clay bridges in lamellae; neutral; clear wavy boundary.

**C1**—20 to 46 inches, brown (10YR 5/3) sand, dark brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; few fine and very fine roots; many very fine interstitial pores, mildly alkaline; clear wavy boundary.

**C2**—46 to 58 inches, pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; many very fine interstitial pores, moderately alkaline; abrupt wavy boundary.

**C3**—58 to 65 inches, brown (10YR 5/3) sand, dark brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; few fine and very fine roots; many very fine interstitial pores, moderately alkaline.

#### Range in characteristics

*Profile:* Soil moisture - moist in winter and early in spring, dry the rest of the year; soil temperature - 53 to 57 degrees F.

*Control section:* Clay content - 10 to 18 percent.

*A horizon:* Value - 5 to 7 dry, 3 or 4 moist; chroma - 1 to 3; reaction - neutral or mildly alkaline.

*Bt horizon:* Value - 5 or 6 dry, 4 or 5 moist; chroma - 3 or 4; reaction - neutral or mildly alkaline; other features - 1 to 10 continuous heavy lamellae of sandy loam or sandy clay loam 3 to 50 millimeters thick comprise the argillic horizon, lamellae commonly are 1 unit of chroma brighter and contain 1 to 3 percent more clay than the interlamellae.

*C and Ck horizons (where present):* Value - 4 to 7 dry, 3 to 5 moist; chroma - 2 or 3; texture - loamy fine sand to coarse sand; other features - unconformable silty lake sediment below a depth of 40 inches in some pedons; reaction - mildly alkaline or moderately alkaline.

### Perazzo Series

The Perazzo series consists of very deep, well drained soils that formed in alluvium derived from various kinds

of rock. These soils are on alluvial fans. Slope is 4 to 15 percent.

**Taxonomic class:** Loamy-skeletal, mixed, mesic Typic Haplargids

**Typical pedon:** Perazzo very stony sandy loam, 4 to 15 percent slopes, lat. 39°35'12" N., long. 119°22'10" W., in sec. 23, T. 20 N., R. 23 E.

**A**—0 to 2 inches, pale brown (10YR 6/3) very stony sandy loam, brown (10YR 4/3) moist, weak medium platy structure; soft, very friable, nonslicky and nonplastic; common very fine roots, many fine and very fine vesicular pores; 30 percent pebbles, 15 percent cobbles, and 4 percent stones; neutral; abrupt smooth boundary.

**Bt1**—2 to 8 inches, light yellowish brown (10YR 6/4) gravelly sandy clay loam, dark yellowish brown (10YR 3/4) moist, moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common coarse, medium, and fine roots and many very fine roots, many fine and very fine tubular and interstitial pores, 25 percent pebbles and 7 percent cobbles; continuous thin and moderately thick clay films on ped faces and in pores; neutral; clear smooth boundary.

**Bt2**—8 to 13 inches, pale brown (10YR 6/3) very gravelly sandy clay loam, dark yellowish brown (10YR 3/4) moist, weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few coarse and medium roots, common fine roots, and many very fine roots, many fine and very fine interstitial and tubular pores, 35 percent pebbles, 10 percent cobbles, and 1 percent stones; many thin clay coatings and bridges, mildly alkaline; clear wavy boundary.

**C**—13 to 34 inches, light brownish gray (10YR 6/2) extremely gravelly sandy loam, dark brown (10YR 3/3) moist, massive, soft, very friable, nonslicky and nonplastic; few medium and fine roots and common very fine roots; many very fine interstitial pores; 50 percent pebbles, 20 percent cobbles, and 1 percent stones; mildly alkaline; gradual wavy boundary.

**2Ck**—34 to 80 inches, light brownish gray (10YR 6/2) extremely gravelly loamy sand, brown (10YR 3/3) moist, massive; soft, very friable, nonslicky and nonplastic; few fine and very fine roots, many very fine interstitial pores; 50 percent pebbles, 15 percent cobbles, and 1 percent stones; strongly effervescent; moderately alkaline.

#### Range in characteristics

**Profile:** Soil moisture - moist for short periods in winter and spring, dry in summer and fall; soil temperature - 52 to 55 degrees F; combined thickness of A and Bt horizons - 10 to 20 inches.

**Control section:** Clay content - 20 to 30 percent, rock fragment content - 35 to 50 percent, mainly pebbles; texture - very gravelly sandy clay loam or very gravelly clay loam; exchangeable sodium content - less than 15 percent in the A and Bt horizons; other features - some pedons have a Btk horizon.

**A horizon:** Value - 6 or 7 dry, 3 to 5 moist; chroma - 2 or 3; structure - platy, subangular blocky, or massive.

**Bt horizon:** Hue - 10YR or 7.5YR; value - 5 or 6 dry, 3 to 5 moist; chroma - 3 or 4; texture of the less-than-2-millimeter fraction - sandy clay loam or clay loam; rock fragment content - 15 to 35 percent in upper part, 45 to 60 percent in lower part, mainly pebbles; structure - subangular blocky or massive; reaction - slightly acid to mildly alkaline; other feature - effervescent in lower part in some pedons.

**C and Ck horizons:** Hue - 10YR or 7.5YR; value - 6 or 7 dry, 3 to 5 moist; chroma - 2 to 4; texture - extremely gravelly sandy loam or extremely gravelly light loam in upper part, extremely gravelly sand or extremely gravelly loamy sand below a depth of 20 inches; reaction - neutral or mildly alkaline in upper part, moderately alkaline to very strongly alkaline in lower part.

## Reno Series

The Reno series consists of moderately deep, well drained soils that formed in mixed alluvium. These soils are on alluvial fans, pediments, and river terraces. Slope is 2 to 15 percent.

**Taxonomic class:** Fine, montmorillonitic, mesic Abruptic Xerochic Durargids.

**Typical pedon:** A Reno cobbly sandy loam, 4 to 15 percent slopes, in an area of Fullerton-Reno association, lat. 39°19'58" N., long. 119°31'53" W., in sec. 20, T. 17 N., R. 22 E.

**A1**—0 to 2 inches, light brownish gray (10YR 6/2) cobbly sandy loam, dark brown (10YR 3/3) moist, strong thick platy structure; hard, very friable, nonslicky and nonplastic; many very fine roots; many very fine and fine vesicular pores; 10 percent pebbles and 10 percent cobbles; slightly acid; abrupt smooth boundary.

**A2**—2 to 4 inches, light brownish gray (10YR 6/2) gravelly fine sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonslicky and nonplastic; common very fine and fine roots and few medium roots, many very fine and common fine interstitial pores, 15 percent pebbles; slightly acid; abrupt smooth boundary.

**AB**—4 to 7 inches, light brownish gray (10YR 6/2) sandy loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic.

common very fine and few fine roots, many very fine and common fine tubular pores, common thin clay films lining pores and on ped faces, 15 percent pebbles and 5 percent cobbles, slightly acid, abrupt smooth boundary

**Bt**—7 to 23 inches, brown (10YR 5/3) clay, dark brown (10YR 4/3) moist, strong medium prismatic structure, very hard, very firm, very sticky and very plastic; few fine and medium sized roots, few very fine tubular pores, continuous pressure faces and slickensides; 10 percent cobbles, neutral, clear smooth boundary

**Bqpm**—23 to 50 inches or more; indurated durpan with laminar surface approximately 1 millimeter thick

#### Range in characteristics

**Profile:** Soil moisture - moist in winter and spring, dry the rest of the year; soil temperature - 47 to 52 degrees F; combined thickness of A and Bt horizons - 20 to 36 inches; other features - tuff or sandstone is at a depth of 40 to 80 inches in some pedons

**Control section:** Clay content - 35 to 60 percent; rock fragment content - 5 to 35 percent; depth to durpan - 20 to 40 inches

**A horizon:** Hue - 10YR or 2.5Y, value - 5 to 7 dry, 3 or 4 moist, chroma - 1 to 3, structure - platy, granular, subangular blocky, massive, or single grain, reaction - medium acid to neutral

**Bt horizon:** Hue - 10YR, 7.5YR or 2.5Y, value - 4 or 5 dry, 3 to 5 moist, chroma - 3 or 4, texture - clay, sandy clay, or clay loam; structure - prismatic or columnar parting to blocky but is massive in lower part of some pedons; rock fragment content - as much as 20 percent pebbles, cobbles, and stones in upper part and 20 to 70 percent in lower part; reaction - slightly acid to mildly alkaline

**Bqpm horizon:** Hue - 10YR, 2.5Y, or 5Y, value - 6 to 8 dry, 3 to 6 moist, chroma - 2 to 4, rock fragment content - 0 to 70 percent

### Reywat Series

The Reywat series consists of shallow, well drained soils that formed in residuum derived from basalt and andesite. These soils are on hills and mountains. Slope is 30 to 50 percent.

**Taxonomic class:** Loamy-skeletal, mixed, mesic Lithic Argixerolis

**Typical pedon:** A Reywat stony loam, 30 to 50 percent slopes, in an area of Oppio-Reywat-Indiano association, lat. 39°23'55" N, long. 119°38'42" W, in sec. 29 T, 18 N, R 21 E

**A1**—0 to 2 inches; grayish brown (10YR 5/2) stony loam, very dark grayish brown (10YR 3/2) moist, moderate medium subangular blocky structure, slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots, many fine and very fine

tubular pores, 15 percent pebbles, 15 percent cobbles, and 1 percent stones, neutral, abrupt smooth boundary

**A2**—2 to 5 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist, moderate medium subangular blocky structure, slightly hard, very friable, slightly sticky and slightly plastic; few fine and many very fine roots, few fine and many very fine tubular pores, 25 percent pebbles and 10 percent cobbles, neutral, clear smooth boundary

**Bt1**—5 to 11 inches; grayish brown (10YR 5/2) very gravelly clay loam, very dark grayish brown (10YR 3/2) moist, strong medium subangular blocky structure; hard, firm, sticky and plastic; few medium roots and common fine and very fine roots, few fine and common very fine tubular pores, many very thin clay films on ped faces, in pores, and as bridges; 25 percent pebbles and 10 percent cobbles, neutral, clear smooth boundary

**Bt2**—11 to 15 inches; dark grayish brown (10YR 4/2) very cobbly clay loam, dark grayish brown (10YR 4/2) moist, strong medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; few fine and common very fine tubular pores, continuous thin and very thin clay films on ped faces and in pores; 10 percent pebbles and 45 percent cobbles, neutral, abrupt smooth boundary

**R**—15 inches, fractured, hard andesite.

#### Range in characteristics

**Profile:** Soil moisture - layer at depth of 4 to 12 inches is dry in all parts for 60 to 80 consecutive days in the 3-month period following the summer solstice in most years and is moist in all parts for 60 consecutive days or more within the 3-month period following the winter solstice (Also, this section is dry in all parts more than half the time (cumulatively) that the soil temperature at a depth of 20 inches is more than 41 degrees F); soil temperature - 47 to 54 degrees F; thickness of the mollic epipedon - 7 to 12 inches; depth to bedrock - 10 to 20 inches; other features - all parts of the profile above lithic contact have base saturation of more than 75 percent

**Control section:** Clay content - 24 to 35 percent; rock fragment content - 35 to 70 percent

**A horizon:** Chroma - 2 or 3; reaction - slightly acid to moderately alkaline; other features - contains 1 percent or more organic matter to a depth of 7 inches or one-third the thickness of the solum, whichever is greater

**Bt horizon:** Value - 5 to 7 dry, 3 to 5 moist; chroma - 2 or 3; texture - loam, clay loam, or sandy clay loam; clay content - 24 to 35 percent; rock fragment content - 35 to 70 percent; pebbles and cobbles or stones; reaction - neutral to moderately alkaline; other features - a small or moderate

accumulation of lime is common in the lower part of this horizon or in cracks in the bedrock.

## Risley Series

The Risley series consists of moderately deep, well drained soils that formed in residuum and colluvium derived from a tared andesite and basalt. These soils are on back slopes of hills and mountains. Slope is 15 to 30 percent.

**Taxonomic class:** Fine, montmorillonitic, mesic Xerolic Haplargids

**Typical pedon:** A Risley very stony loam, 15 to 30 percent slopes, in an area of Risley-Xman-Rock outcrop association, lat. 39°24'02" N., long. 119°32'33" W., in sec. 30, T. 18 N., R. 21 E.

- A1—0 to 1 inch, light brownish gray (10YR 6/2) very stony loam, dark brown (10YR 3/3) moist, moderate fine granular structure, slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots, many fine and very fine interstitial pores, 10 percent pebbles, 10 percent cobbles, and 5 percent stones, neutral abrupt smooth boundary
- A2—1 to 3 inches, brown (10YR 5/3) loam, dark brown (10YR 3/3) moist, moderate fine granular structure, slightly hard, friable, slightly sticky and slightly plastic; few fine and common very fine roots; many fine and very fine interstitial pores; neutral; clear smooth boundary
- Bt—3 to 15 inches, light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/4) moist, moderate medium prismatic structure, hard, firm, sticky and plastic; common coarse, medium, fine, and very fine roots; few medium and fine and common very fine tubular pores, continuous moderately thick clay films on ped faces and in pores, neutral, clear wavy boundary
- Bx—15 to 23 inches, pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist, weak medium subangular blocky structure, hard, firm, sticky and plastic; few medium and fine roots and common very fine roots, common very fine tubular pores; slightly effervescent with strongly effervescent veins; moderately alkaline; clear wavy boundary
- Cr—23 to 30 inches or more; weathered, altered andesite; lime seams and clay films in fractures.

### Range in characteristics

**Profile:** Soil moisture - moist in winter and spring, usually dry the rest of the year; soil temperature - 49 to 50 degrees F

**Control section:** Clay content - 35 to 45 percent; rock fragment content - 0 to 10 percent; depth to soft bedrock - commonly 20 to 30 inches, but in some pedons it is as much as 40 inches; depth to Bk horizon - 14 to 20 inches

**A horizon:** Value - 5 to 7 dry, 3 or 4 moist, chroma - 2 or 3; reaction - medium acid to neutral

**Bt horizon:** Hue - 10YR or 7.5YR, value - 5 or 6 dry, 3 to 5 moist, chroma - 2 to 4, texture - clay sandy clay, or clay loam; clay content - 35 to 45 percent; reaction - slightly acid to moderately alkaline

**Bk horizon:** Reaction - mildly alkaline or moderately alkaline; effervescence - strongly effervescent or violently effervescent

## Sagouspe Series

The Sagouspe series consists of deep, somewhat poorly drained soils on stream terraces and flood plains. These soils formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

**Taxonomic class:** Sandy mixed, mesic Aquic Xerofluvents

**Typical pedon:** Sagouspe sandy loam, 0 to 2 percent slopes, occasionally flooded, lat. 39°32'47" N., long. 119°33'44" W., in sec. 6, T. 19 N., R. 22 E.

- A1—0 to 3 inches; brown (10YR 5/3) sandy loam, dark grayish brown (10YR 4/2) moist, massive; soft, very friable, nonsticky and nonplastic; common medium and many very fine roots; many very fine interstitial pores, moderately alkaline; abrupt smooth boundary
- A2—3 to 11 inches, brown (10YR 5/3) loamy fine sand, dark grayish brown (10YR 4/2) moist; few fine distinct brownish yellow (10YR 6/6) mottles, massive; soft, very friable, nonsticky and nonplastic; common fine and very fine roots, many very fine interstitial pores; moderately alkaline; clear smooth boundary
- C1—11 to 22 inches; brown (10YR 5/3) very fine sandy loam, dark grayish brown (10YR 4/2) moist, common fine prominent strong brown (7.5YR 4/6) mottles, massive, soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; slightly effervescent; strongly alkaline; abrupt smooth boundary
- 2C2—22 to 38 inches, brown (10YR 5/3) sand, dark grayish brown (10YR 4/2) moist, single grain, loose nonsticky and nonplastic; few very fine roots, many very fine interstitial pores; moderately alkaline; clear smooth boundary
- 3C3—38 to 60 inches, grayish brown (2.5Y 5/2) sand, dark brown (10YR 4/3) moist, single grain, loose nonsticky and nonplastic; many fine and very fine interstitial pores; moderately alkaline

### Range in characteristics

**Profile:** Soil moisture - saturated within 40 inches of the soil surface in spring and summer; soil temperature - 53 to 59 degrees F; hue - 10YR or 2.5Y; value - 4 or 5 moist, 5 to 7 dry; chroma - 2 or 3; mottles - mainly relict and at a depth of 3 to 40 inches



*Control section:* Texture - sand and loamy sand but contains thin strata and lenses of loamy material (averages loamy sand or loamy fine sand); reaction - neutral to strongly alkaline; effervescence - none to slight in the coarser textured material and slight to strong in the finer textured material; carbonates - soft masses and concretions of lime at any depth below 20 inches in some pedons

## Saralegui Series

The Saralegui series consists of very deep, well drained soils that formed in alluvial and lacustrine deposits derived mainly from granitic rock. These soils are on fans and terraces. Slope is 0 to 4 percent.

**Taxonomic class:** Coarse-loamy, mixed, mesic Xeroch Hapargids

**Typical pedon:** A Saralegui sand, 0 to 4 percent slopes, in an area of Saralegui-Isoide association, lat. 39°33'23" N., long. 118°32'10" W., in sec. 32, T. 20 N., R. 22 E.

A1—0 to 2 inches, grayish brown (10YR 5/2) sand, very dark grayish brown (10YR 3/2) moist, single grain; loose, nonsticky and nonplastic, many fine and very fine interstitial pores, slightly acid, abrupt smooth boundary

A2—2 to 8 inches, light brownish gray (10YR 6/2) sandy loam, dark brown (10YR 4/3) moist, weak coarse subangular blocky structure, soft, very friable, nonsticky and nonplastic; few fine and common very fine roots, few fine and many very fine tubular pores, neutral, clear smooth boundary

Bt1—9 to 17 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist, moderate medium subangular blocky structure, slightly hard, very friable, slightly sticky and nonplastic; few fine and common very fine roots, few fine and many very fine tubular pores, continuous very thin clay bridges on sand grains, neutral, clear smooth boundary

Bt2—17 to 25 inches, pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist, moderate medium subangular blocky structure, slightly hard, very friable, slightly sticky and nonplastic; few fine roots and common very fine roots, few medium and fine tubular pores and many very fine tubular pores, continuous thin and very thin clay bridges on sand grains, neutral, clear smooth boundary

Bt3—25 to 32 inches, pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist, weak coarse subangular blocky structure, slightly hard, very friable, nonsticky and nonplastic, few fine roots and many very fine roots; few medium and fine tubular pores and many very fine tubular pores, continuous very thin clay bridges on sand grains, neutral, abrupt wavy boundary

C1—32 to 52 inches, grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) moist, massive, soft,

very friable, nonsticky and nonplastic, few fine and very fine roots, many fine and very fine interstitial pores, neutral, abrupt smooth boundary

C2—52 to 60 inches, light brownish gray (10YR 6/2) sandy loam, dark brown (10YR 4/3) moist, massive, soft, very friable, nonsticky and nonplastic, few very fine roots; many very fine interstitial pores, mildly alkaline

### Range in characteristics

*Profile:* Soil moisture - usually dry, moist in winter and spring; soil temperature - 50 to 56 degrees F

*Control section:* Clay content - 12 to 18 percent; rock fragment content - 0 to 15 percent

*A horizon:* Value - 5 or 6 dry; chroma - 1 to 3

*Bt horizon:* Value - 5 or 6 dry; chroma - 3 or 4, texture - sandy loam or coarse sandy loam, reaction - neutral or mildly alkaline

*C horizon:* Value - 5 to 7 dry; chroma - 2 or 3 texture - sandy loam, loamy sand, sand, gravelly sandy loam, or gravelly loamy sand, reaction - neutral to strongly alkaline; effervescence - noneffervescent or slightly effervescent

## Singatse Series

The Singatse series consists of very shallow, somewhat excessively drained soils that formed in residuum and colluvium derived from volcanic rock. These soils are on the sides of hills and mountains. Slope is 30 to 75 percent.

**Taxonomic class:** Loamy-skeletal, mixed (calcareous) mesic Lithic Torriorthents

**Typical pedon:** A Singatse very stony sandy loam, 30 to 75 percent slopes, in an area of Theon-Singatse association, lat. 39°33'28" N., long. 119°27'27" W., in sec. 36, T. 20 N., R. 22 E.

A—0 to 1 inch, light brownish gray (10YR 6/2) very stony sandy loam, brown (10YR 4/3) moist, weak thick platy structure, soft, very friable, nonsticky and nonplastic, many very fine roots, many very fine and fine vesicular pores, 55 percent pebbles, 5 percent cobbles, and 10 percent stones, strongly effervescent, strongly alkaline, abrupt smooth boundary

C—1 to 6 inches, pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist, massive, slightly hard, very friable, nonsticky and nonplastic; many very fine roots and common fine roots, many very fine and fine interstitial pores, 40 percent pebbles, 5 percent cobbles, and 5 percent stones, strongly effervescent, strongly alkaline, abrupt wavy boundary

R—6 inches, buff that is weathered in the upper few inches.



**Range in characteristics**

*Profile.* Soil moisture - usually dry, moist in winter and spring; dry from early in May to October; soil temperature - 49 to 54 degrees F; depth to lithic contact - 4 to 10 inches

*Control section.* Clay content - 5 to 15 percent; rock fragment content - 35 to 60 percent, mostly pebbles; texture - very gravelly loam or very gravelly sandy loam; reaction - moderately alkaline or strongly alkaline

*A horizon:* Hue - 10YR or 2.5Y, value - 6 or 7 dry, 4 or 5 moist; chroma - 2 or 3

*C horizon:* Hue 10YR or 2.5Y, value - 6 or 7 dry, 4 or 5 moist; chroma - 2 or 3

**Smallcone Series**

The Smallcone series consists of very shallow, well drained soils that formed in residuum and colluvium derived from altered andesite. These soils are on mountain slopes. Slope is 15 to 50 percent.

**Taxonomic class:** Loamy-skeletal, mixed, nonacid, mesic Lithic Xeric Torriorthents.

**Typical pedon:** A Smallcone very gravelly coarse sandy loam, 15 to 50 percent slopes, in an area of Duco-Sma cone-Cagle association, lat. 39°22'14" N., long. 119°40'33" W., in sec. 6, T. 17 N., R. 21 E.

A1—0 to 2 inches, very pale brown (10YR 7/4) very gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist, massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine interstitial pores; 50 percent pebbles and 5 percent cobbles; medium acid; clear smooth boundary

C—2 to 6 inches, very pale brown (10YR 7/4) very gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist, massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores; 50 percent pebbles and 5 percent cobbles; medium acid; abrupt irregular boundary

R—6 inches, consolidated altered andesite

**Range in characteristics**

*Profile.* Soil moisture - moist in winter and spring, dry the rest of the year; soil temperature - 47 to 52 degrees F

*Control section:* Clay content - 5 to 18 percent; rock fragment content - 35 to 75 percent, mostly fine pebbles; depth to bedrock - 4 to 10 inches; reaction - medium acid or strongly acid

*A and 3C horizons:* Value - 6 or 7 dry, 4 or 5 moist; chroma - 4 to 6

**Springmeyer Series**

The Springmeyer series consists of very deep, well drained soils that formed in alluvium derived from various

kinds of rock. These soils are on alluvial fans and terraces. Slope is 4 to 15 percent.

**Taxonomic class:** Fine-loamy mixed, mesic Aridic Argixerolls

**Typical pedon:** A Springmeyer gravelly loam 8 to 15 percent slopes, in an area of Springmeyer-Reno association, lat. 39°16'02" N., long. 119°40'16" W. in sec. 7, T. 16 N., R. 21 E.

A1—0 to 2 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure, slightly hard, very friable, nonsticky and nonplastic; many very fine roots, few fine and many very fine tubular and interstitial pores; 20 percent pebbles and 10 percent cobbles; neutral; abrupt smooth boundary

A2—2 to 6 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure, slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; common fine and many very fine tubular pores; 20 percent pebbles and 10 percent cobbles; neutral; abrupt smooth boundary

Bt1—6 to 10 inches, brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; strong coarse subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots and few medium roots; few medium, common fine, and many very fine tubular pores; few thin clay films on ped faces and as bridges; 5 percent pebbles and 5 percent cobbles; neutral; abrupt smooth boundary

Bt2—10 to 28 inches, brown (10YR 5/3) cobbly clay loam, dark yellowish brown (10YR 4/4) moist; strong coarse prismatic structure; hard, firm, very sticky and plastic; few very fine, fine, medium, and coarse roots; few medium and fine tubular pores and common very fine tubular pores; many clay films on ped faces and lining pores; 10 percent pebbles and 10 percent cobbles; neutral; clear smooth boundary

Bt3—28 to 46 inches, brown (7.5YR 5/4) gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; hard, friable, sticky and plastic; few very fine roots, few fine and common very fine tubular pores; few thin clay films on ped faces and lining pores; 25 percent pebbles and 10 percent cobbles; neutral; clear wavy boundary

C—46 to 60 inches, light brown (7.5YR 6/4) very gravelly fine sandy loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; 45 percent pebbles and 10 percent cobbles; neutral.

**Range in characteristics**

*Profile:* Soil moisture - moist from November to early in June, dry the rest of the year; soil temperature - 47 to

53 degrees F. thickness of the mollic epipedon - 7 to 20 inches

**Control section:** Clay content - 25 to 35 percent; rock fragment content - 5 to 35 percent; reaction - neutral or slightly acid; other features - relict mottles are in the B and C horizons of some pedons, as much as 5 percent durinodes are in some pedons below a depth of 40 inches

**A horizon:** Value - 4 or 5 dry, 2 or 3 moist; chroma - 2 or 3; structure - granular angular, subangular blocky, or platy

**Bt horizon:** Hue - 10YR or 7.5YR; value - 5 or 6 dry, 3 or 4 moist; chroma - 2 to 4; texture - clay loam or heavy sandy clay loam modified by 5 to 35 percent rock fragments; structure - prismatic or subangular blocky

**C horizon:** Hue - 10YR or 7.5YR; value - 5 to 7 dry, 4 or 5 moist; chroma - 3 or 4; texture - stratified extremely gravelly loamy sand to sandy clay loam; rock fragment content - 5 to 70 percent; reaction - moderately alkaline in some pedons

### Springmeyer Variant

The Springmeyer Variant consists of very deep, moderately well drained soils that formed in alluvium derived from basic igneous rock. These soils are in partially drained intermontane valley fans. Slope is 0 to 2 percent.

**Taxonomic class:** Fine-loamy mixed, mesic Pachic Argixerols

**Typical pedon:** Springmeyer Variant loam, 0 to 2 percent slopes, lat. 39°23'30" N., long. 119°37'27" W., in sec. 28, T. 18 N., R. 21 E.

**A1**—0 to 2 inches, brown (10YR 4/3) loam, very dark brown (10YR 2/2) moist, weak medium and thick platy structure parting to moderate fine granular, soft, very friable, nonsticky and nonplastic, few coarse and medium roots, common fine roots, and many very fine roots, many very fine interstitial pores; neutral; clear smooth boundary

**A2**—2 to 7 inches, brown (10YR 4/3) loam, very dark brown (10YR 2/2) moist, weak medium and thick platy structure parting to moderate fine granular, soft, very friable, slightly sticky and slightly plastic, few coarse and medium roots and common fine and very fine roots, few medium tubular pores and common fine and very fine tubular pores; neutral; clear smooth boundary

**Bt1**—7 to 17 inches, brown (10YR 4/3) silt loam, dark brown (10YR 3/3) moist, weak coarse prismatic structure parting to moderate medium and fine subangular blocky, hard, friable, sticky and plastic; few coarse, medium, and fine roots and common very fine roots, few medium and fine tubular pores and common very fine tubular pores, many very thin clay films on ped faces and in pores, neutral; clear smooth boundary

**Bt2**—17 to 36 inches, brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist, weak coarse prismatic structure parting to strong medium angular blocky, very hard, friable, sticky and plastic; few fine and very fine roots; few medium, fine, and very fine tubular pores, continuous thin and very thin clay films on ped faces and in pores, neutral; gradual, smooth boundary

**Bt3**—36 to 47 inches, brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist, moderate medium and coarse subangular blocky structure; hard, friable, sticky and plastic; few fine and very fine roots, few fine and very fine tubular pores; many very thin clay films on ped faces and in pores, neutral; gradual smooth boundary

**Bqk**—47 to 65 inches, pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist, common medium distinct (5B6 6/1) mottles, massive; hard, friable, slightly sticky and slightly plastic; few very fine roots, few very fine tubular pores; strongly effervescent, moderately alkaline

#### Range in characteristics

**Profile:** Soil moisture - moist in upper part in winter and spring and dry the rest of the year, moist in capillary fringe throughout the year, saturated below a depth of 4 to 6 feet all year; soil temperature - 50 to 52 degrees F; mollic epipedon thickness - 20 to 50 inches (includes part or all of the argillic horizon); sodium thickness - 36 to 50 inches

**Control section:** Clay content - 24 to 30 percent; rock fragment content - 0 to 10 percent

**A horizon:** Value - 4 or 5 dry, 2 or 3 moist; chroma - 2 or 3; structure - granular or platy; reaction - neutral or slightly acid

**Bt horizon:** Value - 4 to 6 dry, 2 or 3 moist; chroma - 3 or 4; texture - clay loam, silt loam, or silty clay loam; clay content - 24 to 30 percent; reaction - neutral or slightly acid

**Bqk horizon:** Value - 6 or 7 dry, 4 or 5 moist; chroma - 2 to 4; texture - silt loam or loam; reaction - moderately alkaline or strongly alkaline; effervescence - slightly effervescent to strongly effervescent

### Stingdorn Series

The Stingdorn series consists of shallow well drained soils that formed in residuum derived from rhyolitic rock. These soils are on plateaus. Slope is 4 to 15 percent.

**Taxonomic class:** Loamy-skeletal mixed, mesic, shallow Typic Durargids

**Typical pedon:** A Stingdorn very cobbly loam, 4 to 15 percent slopes, in an area of Cleaver-Stingdorn association, lat. 39°32'41" N., long. 119°28'18" W., in sec. 2, T. 19 N., R. 22 E.

**A1**—0 to 5 inches, pale brown (10YR 6/3) very cobbly loam, dark brown (10YR 4/3) moist; moderate fine granular structure, slightly hard, friable, sticky and plastic; few fine roots and common very fine roots; many very fine interstitial pores; 20 percent pebbles and 20 percent cobbles; mildly alkaline; clear smooth boundary

**Bt1**—5 to 9 inches, brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; few medium roots, common fine roots and many very fine roots; few fine and many very fine tubular pores; 25 percent pebbles, 10 percent cobbles, and 1 percent stones; continuous thin and moderately thick clay bridges and coatings on ped faces and in pores; mildly alkaline; clear smooth boundary

**Btk**—9 to 14 inches, pale brown (10YR 6/3) very gravelly loam, dark yellowish brown (10YR 4/4) moist; weak medium and fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few medium and fine roots and common very fine roots; few fine and many very fine tubular pores; 30 percent pebbles, 10 percent cobbles, and 1 percent stones; continuous thin and very thin clay bridges and coatings on sand grains; mildly alkaline matrix with moderately alkaline and strongly effervescent masses near pan fragments; abrupt smooth boundary

**Bqkm**—14 to 16 inches, white, indurated, silica-lime hardpan

**R**—15 inches, hard rhyolitic tuff

#### Range in characteristics

*Profile.* Soil moisture - usually dry, but moist for short periods in winter; soil temperature - 52 to 54 degrees F; combined thickness of A and Bt horizons - 7 to 16 inches; depth to indurated hardpan over hard bedrock - 8 to 20 inches

*A horizon.* Hue - 10YR or 2.5Y, value - 6 or 7 dry, 4 or 5 moist; chroma - 2 or 3; reaction - mildly alkaline to strongly alkaline

*Bt horizon.* Hue - 10YR or 2.5Y, value - 5 or 6 dry, 4 or 5 moist; chroma - 3 or 4; clay content - averages 27 to 35 percent, but some layers in some pedons are slightly less; rock fragment content - 35 to 50 percent; reaction - mildly alkaline to strongly alkaline; other features - slightly effervescent in lower layer in some pedons

*C horizon.* Hue - 10YR or 2.5Y, value - 6 to 8 dry, 6 or 7 moist; chroma - 2 or 3; reaction - moderately alkaline or strongly alkaline

### Teguro Series

The Teguro series consists of shallow, well drained soils that formed in residuum and colluvium derived from

andesite. These soils formed on convex mountain back slopes and ridges. Slope is 4 to 30 percent.

**Taxonomic class:** Loamy mixed, frigid Lithic Argixerolls.

**Typical pedon:** A Teguro gravelly loam, 4 to 30 percent slopes, in an area of Teguro-Indano-Oppio association, lat. 39°21'43"N., long. 119°39'09" W. in sec 5, T. 17 N., R. 21 E.

**A**—0 to 2 inches, grayish brown (10YR 5/2) gravelly loam, dark brown (10YR 3/3) moist; moderate thick platy structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many fine vesicular pores and few fine and very fine tubular pores; 15 percent pebbles; slightly acid; abrupt smooth boundary

**Bt1**—2 to 9 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; few medium and fine roots and common very fine roots; few very fine tubular pores; 15 percent pebbles and 5 percent cobbles; common very thin clay films on ped faces and in pores; neutral; clear wavy boundary

**Bt2**—9 to 18 inches, yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; strong very coarse subangular blocky structure; hard, firm, sticky and plastic; root mats on ped faces; 15 percent pebbles; common thin clay films on ped faces; neutral; clear wavy boundary

**R**—19 inches, andesite; clay fills cracks in upper 2 inches.

#### Range in characteristics

*Profile.* Soil moisture - moist in winter and spring, dry from mid-July to early in October; soil temperature - 43 to 47 degrees F; mollic epipedon - 7 to 12 inches thick (includes upper part of Bt horizon); thickness of A and Bt horizons and depth to bedrock - 14 to 20 inches

*Control section.* Clay content - 25 to 35 percent; rock fragment content - 15 to 35 percent, mainly pebbles; reaction - slightly acid or neutral

*A horizon.* Value - 4 or 5 dry, 2 or 3 moist; chroma - 2 or 3 dry or moist

*Bt horizon.* Value - 5 or 6 dry, 3 or 4 moist; chroma - 3 or 4 dry or moist; texture - gravelly loam or gravelly clay loam

### Theon Series

The Theon series consists of shallow, well drained soils that formed in residuum and colluvium derived from andesitic tuff. These soils are on foothills and low mountains. Slope is 15 to 75 percent.

**Taxonomic class:** Loamy-skeletal, mixed, mesic Lithic Haplargids.

**Typical pedon:** A Theon stony sandy loam, 15 to 50 percent slopes, in an area of Theon-Old Camp association, lat. 39°33'21" N, long 119°28'06" W, in sec. 31, T 19 N, R 23 E

- A—0 to 2 inches, light brownish gray (10YR 6/2) stony sandy loam, dark grayish brown (10YR 4/2) moist, weak medium granular structure, soft, very friable, nonsticky and nonplastic, many very fine roots, many very fine and few fine interstitial pores, 45 percent pebbles and 1 percent stones, mildly alkaline, abrupt smooth boundary
- Bt1—2 to 5 inches, pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 4/3) moist, weak fine subangular blocky structure, slightly hard, friable, slightly sticky and slightly plastic; many very fine roots and few fine roots, many very fine and few fine interstitial pores, many thin clay films as bridges and coatings, 30 percent pebbles, 5 percent cobbles, and 1 percent stones, mildly alkaline, clear smooth boundary
- Bt2—5 to 10 inches, pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 4/3) moist, moderate fine subangular blocky structure, slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots, many very fine and few fine interstitial pores, continuous thin colloidal bridges between mineral grains and few thin clay films on ped faces and lining pores, 35 percent pebbles, 5 percent cobbles, and 1 percent stones, mildly alkaline, abrupt smooth boundary
- R—10 inches, andesitic tuff that is weathered in the upper 2 inches

#### Range in characteristics

*Profile.* Soil moisture - moist in winter and spring, dry late in May to November, soil temperature - 48 to 54 degrees F, combined thickness of A and Bt horizons - 8 to 14 inches, depth to lithic contact - 8 to 14 inches

*Control section.* Clay content - 25 to 35 percent, rock fragment content - 35 to 80 percent, mainly pebbles

*A horizon.* Value - 5 to 7 dry, 3 to 5 moist, chroma - 2 to 4, rock fragment content - 35 to 80 percent, mainly pebbles or stones, structure - platy or granular, reaction - neutral to moderately alkaline

*Bt horizon.* Hue - 10YR, 7.5YR, or 5YR, value - 4 to 7 dry, 3 to 5 moist, chroma - 3 or 4, texture - very gravelly clay loam, very gravelly sandy clay loam, or very gravelly loam (extremely gravelly layers in some pedons), reaction - neutral to strongly alkaline

*R horizon.* Discontinuous thin coatings of silica or silica and lime along weak fracture planes in some pedons

### Tristan Series

The Tristan series consists of deep, well drained soils that formed in residuum and colluvium derived from

basic igneous rock. These soils are on mountain back slopes. Slope is 15 to 50 percent

**Taxonomic class:** Loamy-skeletal, mixed, mesic Aridic Argixerolls.

**Typical pedon:** A Tristan very stony loam, 30 to 50 percent slopes, in an area of Tristan-Burnborough-Gabica association, lat. 39°19'11" N, long 119°38'54" W, in sec. 20, T 17 N, R 21 E

- A—0 to 9 inches, grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist, weak medium granular structure, soft, very friable, nonsticky and nonplastic, few coarse, medium, and fine roots and many very fine roots, many fine and very fine interstitial pores, 45 percent pebbles, 10 percent cobbles, and 3 percent stones, neutral, clear smooth boundary
- Bt1—8 to 17 inches, brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist, weak fine subangular blocky structure, soft, friable, slightly sticky and slightly plastic, few coarse and medium roots and and common fine and very fine roots, many fine and very fine tubular pores, 40 percent pebbles, 10 percent cobbles, and 3 percent stones, continuous very thin clay coatings and bridges on sand grains, neutral, clear wavy boundary
- Bt2—17 to 26 inches, brown (10YR 5/3) very gravelly clay loam, brown (10YR 4/3) moist, weak medium and fine subangular blocky structure, slightly hard, friable, slightly sticky and slightly plastic, few coarse roots, common medium roots and many fine and very fine roots, few fine and common very fine tubular pores, 40 percent pebbles, 15 percent cobbles, and 3 percent stones, continuous very thin clay films on ped faces and in pores, neutral, gradual wavy boundary
- Bt3—26 to 36 inches, yellowish brown (10YR 5/4) very cobbly clay loam, dark yellowish brown (10YR 4/4) moist, weak medium and fine subangular blocky structure, hard, friable, slightly sticky and slightly plastic, common medium, fine, and very fine roots, few medium and fine tubular pores and common very fine tubular pores, 30 percent pebbles, 20 percent cobbles, and 3 percent stones, continuous thin and very thin clay films on ped faces and in pores, neutral, gradual wavy boundary
- Bt4—36 to 54 inches, light yellowish brown (10YR 6/4) extremely cobbly loam, dark yellowish brown (10YR 4/4) moist, weak medium and coarse subangular blocky structure, hard, friable, slightly sticky and slightly plastic, few medium roots and common fine and very fine roots, few fine and common very fine tubular pores, 30 percent pebbles, 30 percent cobbles, and 5 percent stones, continuous thin and very thin clay films on ped faces and in pores, neutral, abrupt wavy boundary

R—54 to 60 inches, fractured andesite; roots and soil material in cracks

#### Range in characteristics

*Profile:* Soil moisture - moist in winter and spring, dry for 90 to 110 days late in summer and in fall; soil temperature - 47 to 53 degrees F; mollic epipedon thickness - 10 to 20 inches (includes upper part of Bt horizon)

*Control section:* Texture - loam or clay loam modified by rock fragments; clay content - 18 to 35 percent; rock fragment content - 35 to 60 percent; depth to bedrock - 40 to 60 inches; reaction - neutral or mildly alkaline

*A horizon:* Value - 4 or 5 dry, 2 or 3 moist; chroma - 2 or 3

*Bt horizon:* Hue - 10YR or 7.5YR, value - 4 to 6 dry, 3 or 4 moist; chroma - 2 to 4; structure - angular or subangular blocky in some or all parts; rock fragment content - 35 to 60 percent in upper part, 60 to 80 percent in lower part, mainly cobbles

### Veta Series

The Veta series consists of very deep, well drained soils that formed in alluvium derived from various kinds of rock. These soils are on alluvial fans and stream terraces. Slope is 2 to 8 percent.

**Taxonomic class:** Loamy-skeletal, mixed, mesic Xerollic Camborthids

**Typical pedon:** Veta very gravelly sandy loam, 2 to 8 percent slopes, lat. 39°21'11"N., long. 119°28'06" W., in sec. 12, T. 17 N., R. 22 E.

A1—0 to 1 inch, brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; weak thin platy structure; soft, very friable, nonsticky and nonplastic; many very fine interstitial pores; 35 percent pebbles; neutral abrupt smooth boundary

A2—1 to 6 inches, pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine and few fine interstitial pores; 40 percent pebbles; neutral clear wavy boundary

Bw—6 to 20 inches, yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots and few medium and coarse roots; many very fine interstitial pores; common very thin colloid stains on mineral grains; 60 percent pebbles; neutral clear wavy boundary

C—20 to 40 inches, brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; many very fine

interstitial pores; 55 percent pebbles; neutral clear wavy boundary

Ck—40 to 60 inches, pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; many very fine interstitial pores; 50 percent pebbles and 5 percent cobbles; noneffervescent matrix with strongly effervescent masses; moderately alkaline

#### Range in characteristics

*Profile:* Soil moisture - moist in winter and spring, dry in mid June to October; soil temperature - 50 to 53 degrees F; combined thickness of A and Bw horizons - 12 to 20 inches; depth to lime - 28 to 40 inches

*Control section:* Texture - very gravelly or extremely gravelly loam, sandy loam, or coarse sandy loam; clay content - 5 to 15 percent; rock fragment content - 35 to 75 percent, mainly pebbles; reaction - neutral to moderately alkaline

*A horizon:* Value - 5 or 6 dry, 3 or 4 moist; chroma - 2 or 3; rock fragment content - 35 to 80 percent pebbles or cobbles

*Bw horizon:* Value - 5 or 6 dry, 3 or 4 moist; chroma - 3 or 4; structure - subangular blocky or ~~blocky~~

*C horizon:* Value - 5 to 7 dry, 3 to 5 moist; chroma - 2 or 3; effervescence - slightly effervescent to strongly effervescent in the lower layer; other features - common thin strata of loamy sand or sandy coarse sand in lower layers of some pedons

### Wedekind Series

The Wedekind series consists of shallow, well drained soils that formed in residuum and colluvium derived from andesite and rhyolite. These soils are on hills and mountains. Slope is 30 to 50 percent.

**Taxonomic class:** Loamy, mixed, mesic shallow Andic Argixerolls.

**Typical pedon:** A Wedekind gravelly loam, 30 to 50 percent slopes, in an area of Wedekind-Xman-ndano association, lat. 39°18'32" N., long. 119°38'44" W., in sec. 29, T. 17 N., R. 21 E.

A—0 to 7 inches, brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium and coarse granular structure; soft, very friable, slightly sticky and slightly plastic; few medium roots and many fine and very fine roots; many fine and very fine interstitial pores; 30 percent pebbles; neutral clear smooth boundary

Bt—7 to 13 inches, yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few

coarse roots, common medium roots, and many fine and very fine roots, few medium tubular pores and many fine and very fine tubular pores, 30 percent pebbles, continuous thin and moderately thick clay films on ped faces and in pores, neutral; abrupt smooth boundary.

Cr—13 to 60 inches, weathered andesite; clay films in fractures in upper part.

#### Range in characteristics

*Profile.* Soil moisture - usually dry, but moist in winter and spring; soil temperature - 49 to 52 degrees F.

*Control section:* Clay content - 18 to 27 percent; rock fragment content - 5 to 35 percent; depth to bedrock - 10 to 20 inches; reaction - neutral or slightly acid.

*A horizon.* Value - 4 or 5 dry, 2 or 3 moist; chroma - 2 or 3.

*B horizon:* Hue - 10YR or 7.5YR, value - 4 or 5 dry, 3 or 4 moist; chroma - 2 to 4; clay content - 22 to 32 percent; other features - layers of sandy loam or clay loam in some pedons.

### Xerta Series

The Xerta series consists of moderately deep, well drained soils that formed in residuum derived from basalt. These soils are on hills and plateaus. Slope is 4 to 15 percent.

**Taxonomic class:** Fine, montmorillonitic, mesic Aridic Durixerolls.

**Typical pedon:** A Xerta extremely stony clay loam, 4 to 15 percent slopes, in an area of Xerta-Devada-Isler association, lat. 39°22'56" N., long. 119°37'04" W., in sec. 34 T. 18 N., R. 21 E.

A—0 to 1 inch, brown (10YR 4/3) extremely stony clay loam, very dark grayish brown (10YR 3/2) moist, moderate fine subangular blocky structure; hard, firm, sticky and plastic; many very fine roots, many very fine tubular pores, 15 percent pebbles, 10 percent cobbles, and 40 percent stones; mildly alkaline; clear wavy boundary.

Bt1—1 to 5 inches, dark brown (7.5YR 3/2) clay, dark brown (10YR 3/3) moist, moderate medium prismatic structure, hard, firm, very sticky and very plastic; common very fine roots, common very fine tubular pores, 10 percent cobbles; continuous thin and moderately thick clay films on ped faces, moderately alkaline; clear irregular boundary.

Bt2—5 to 10 inches, dark brown (7.5YR 3/2) cobbly clay, dark brown (7.5YR 3/2) moist, moderate medium prismatic structure; very hard, very firm, very sticky and very plastic, few coarse roots and common fine and very fine roots, few very fine tubular pores, 20 percent cobbles, continuous moderately thick clay films on ped faces and in pores; mildly alkaline, abrupt irregular boundary.

Bt3—10 to 21 inches, dark brown (7.5YR 3/4) clay, dark brown (7.5YR 3/4) moist, moderate medium prismatic structure; very hard, very firm, very sticky and very plastic; few coarse roots and common fine and very fine roots; few very fine and fine tubular pores; 5 percent cobbles; continuous moderately thick clay films on ped faces and in pores; mildly alkaline; abrupt irregular boundary.

Blk—21 to 25 inches; dark brown (7.5YR 3/4) very cobbly clay loam, dark brown (7.5YR 3/4) moist, moderate medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; few coarse and very fine roots, few very fine tubular pores; 10 percent pebbles, 30 percent cobbles, and 2 percent stones, continuous moderately thick clay films on ped faces and in pores, slightly effervescent; moderately alkaline; abrupt wavy boundary.

Bqkm—25 to 29 inches, pink (7.5YR 7/4) indurated silica-lime hardpan.

R—29 inches, basalt.

#### Range in characteristics

*Profile.* Soil moisture - moist in winter and spring; soil temperature - 47 to 54 degrees F, combined thickness of A and Bt horizons - 20 to 40 inches; maximum pedon thickness - 7 to 14 inches (includes upper part of Bt horizon in some pedons); depth to hardpan and bedrock - 20 to 40 inches.

*Control section.* Clay content - 40 to 60 percent; rock fragment content - 0 to 15 percent, either basalt or pan fragments.

*A horizon.* Value - 4 or 5 dry, 2 or 3 moist; chroma - 2 or 3; structure - platy, subangular blocky or angular blocky; reaction - neutral or mildly alkaline.

*Bt horizon.* Hue - 10YR or 7.5YR, value - 3 to 6 dry, 3 to 5 moist; chroma - 2 to 4; texture - clay in upper part, clay loam or loam in lower part; reaction - mildly alkaline or moderately alkaline.

*Blk horizon:* Rock fragment content - 35 to 60 percent basalt or pan fragments (pebbles).

*Bqkm horizon.* Continuous silica laminae 1 to 2 millimeters thick.

### Xman Series

The Xman series consists of shallow, well drained soils that formed in residuum and colluvium derived from rhyolite and altered andesite. These soils are on plateaus and hilltops. Slope is 4 to 50 percent.

**Taxonomic class:** Clayey, montmorillonitic, mesic, shallow Xerollic Haplargids.

**Typical pedon:** An Xman very stony loam, 30 to 50 percent slopes, in an area of Xman-Duco association, lat. 39°27'32" N., long. 119°38'27" W., in sec. 5 T. 18 N., R. 21 E.

- A1**—0 to 2 inches, pale brown (10YR 6/3) very stony loam, dark brown (10YR 3/3) moist, moderate medium platy structure, slightly hard, friable, slightly sticky and slightly plastic, few medium roots, common fine roots, and many very fine roots, few fine tubular pores and many very fine interstitial pores, 30 percent pebbles, 2 percent cobbles, and 3 percent stones, neutral, clear smooth boundary
- A2**—2 to 5 inches, pale brown (10YR 6/3) gravelly loam, dark brown (10YR 3/3) moist, weak fine subangular blocky structure, slightly hard, friable, slightly sticky and slightly plastic, few fine roots and many very fine roots, few very fine and common fine tubular pores, 25 percent pebbles, neutral, clear wavy boundary
- Bt1**—5 to 11 inches, light yellowish brown (10YR 6/4) gravelly clay, dark yellowish brown (10YR 4/4) moist, strong coarse angular blocky and subangular blocky structure, hard, firm, very sticky and very plastic, few very fine roots, few very fine tubular pores, 15 percent pebbles, continuous moderately thick clay films on ped faces and in pores, neutral, gradual smooth boundary
- Bt2**—11 to 18 inches, yellowish brown (10YR 5/4) gravelly clay, dark yellowish brown (10YR 4/4) moist, strong medium prismatic structure and strong coarse angular blocky, hard, very firm, very sticky and very plastic, few very fine and fine roots, 10 percent pebbles, continuous moderately thick clay films on ped faces and in pores, neutral, clear smooth boundary
- Cr**—18 to 35 inches, highly weathered andesite, gypsum on underside of rock fragments, few very fine and fine roots in cracks and seams, clear smooth boundary
- R**—35 inches, hard, altered andesite

#### Range in characteristics

**Profile:** Soil moisture - moist in winter and spring; soil temperature - 50 to 64 degrees F, depth to paralithic contact - 10 to 20 inches; depth to hard bedrock - 20 to 40 inches

**Control section:** Clay content - 40 to 50 percent; rock fragment content - 0 to 30 percent, mostly pebbles

**A horizon:** Value - 5 or 6 dry, 3 or 4 moist, chroma - 2 or 3, reaction - slightly acid or neutral; other features - so commonly cracks to the surface, especially where the A horizon is thin

**Bt horizon:** Hue - 10YR or 7.5YR, value - 4 to 6 dry, 4 or 5 moist, chroma - 3 or 4, structure - commonly prismatic, but angular or subangular blocky in upper and lower parts in some pedons; reaction - commonly slightly acid or neutral, but moderately alkaline in lower part in some pedons

## Zephan Series

The Zephan Series consists of moderately deep, well-drained soils that formed in residuum and colluvium derived from altered andesite. These soils are on lower mountain slopes. Slope is 15 to 50 percent.

**Taxonomic class:** Clayey-skeletal montmorillonitic mesic Xerochic Haplargids

**Typical pedon:** A Zephan stony sandy loam, 15 to 50 percent slopes, in an area of Xman-Zephan-Mzei association, lat. 39°29'12" N., long. 119°39'47" W., in sec. 29, T. 19 N., R. 21 E.

- A**—0 to 3 inches, pinkish gray (7.5YR 6/2) stony sandy loam, dark brown (7.5YR 4/4) moist, weak thick platy structure, soft, very friable, slightly sticky and slightly plastic, many very fine roots and common fine roots, common very fine tubular pores and common very fine and fine vesicular pores, 50 percent pebbles and 2 percent stones, neutral, clear smooth boundary
- Bt1**—3 to 10 inches, brown (7.5YR 4/4) very gravelly clay, dark brown (7.5YR 4/4) moist, weak coarse prismatic structure, very hard, very firm, sticky and plastic, common fine and very fine roots, common fine and very fine tubular pores, common moderately thick clay films on ped faces and in pores, 50 percent pebbles, slightly acid, clear wavy boundary
- Bt2**—10 to 21 inches, strong brown (7.5YR 5/6) very gravelly clay loam, strong brown (7.5YR 4/6) moist, massive, very hard, firm, sticky and plastic, few very fine and fine roots, few fine tubular pores, common moderately thick clay films in pores, 55 percent pebbles, slightly acid, clear wavy boundary
- Bt3**—21 to 31 inches, strong brown (7.5YR 5/6), extremely gravelly clay loam, strong brown (7.5YR 4/6) moist, massive, very hard, firm, sticky and plastic, common thin clay bridges and coatings on rock fragments, 50 percent pebbles and 10 percent cobbles, slightly acid, abrupt irregular boundary
- Cr**—31 to 41 inches, weathered andesite
- R**—41 inches, hard andesite

#### Range in characteristics

**Profile:** Soil moisture - usually dry, but moist in winter and spring; soil temperature - 49 to 53 degrees F, depth to paralithic contact - 25 to 40 inches, depth to hard bedrock - 40 to 50 inches

**Control section:** Clay content - 35 to 45 percent, rock fragment content - 35 to 60 percent

**A horizon:** Hue - 10YR or 7.5YR, value - 5 or 6 dry, 3 or 4 moist, chroma - 2 to 4; reaction - commonly medium acid to neutral

**B horizon:** Hue - 10YR or 7.5YR, value - 4 to 6 dry, 4 or 5 moist; chroma - dominantly 3 or 4, but may be as

high as 6 in lower part in some pedons. texture clay, sandy clay or clay loam

*C horizon.* Thin medium acid or strongly acid C horizon above bedrock in some pedons



## Formation of the Soils

Soil is a natural body on the Earth's surface in which plants grow. It is a mixture of varying proportions of rock, minerals, organic matter, water, and air. The rock and minerals are fragmented and are partly or wholly weathered. Soils have distinctive layers, or horizons, that are the product of environmental forces acting upon material deposited or accumulated through geologic activity.

Soils differ one from the other in different localities and within short distances. The differences are the result of the interaction of five soil-forming factors that are known to affect soil formation. These factors are (1) climate, mainly the temperature and kind and amount of precipitation that have existed since accumulation of the parent material; (2) relief, mainly as it affects the internal and external soil properties such as drainage, aeration, susceptibility to erosion, and exposure to sun and wind; (3) biological forces, mainly the plant cover and the organisms living in and on the soil; (4) parent material, including texture and structure of the material as well as its mineralogic and chemical composition; and (5) the length of time that the soil-forming factors have been operating.

The overall landscape of the area, mainly the sequence of mountains and valleys, is the result of geologic, stratigraphic, and structural control. The present topography and landforms are the result of events during Quaternary time. The kinds of soil that formed are indicative of the stability and age of the surfaces of the landforms on which they occur.

### Climate

The climate of the survey area is characterized by warm, dry summers and cool, moist winters. The average annual precipitation ranges from about 5 inches at the lower elevations in the eastern part of the survey area to about 14 inches at the highest elevations in the western part. The average annual air temperature ranges from about 43 degrees F at the highest elevations to about 52 degrees at the lowest. Major climatic variations are the result of the effects of relief and the proximity to the Sierra Nevada to the west. As a result, the soils in the survey area reflect a general zonation with respect to elevation modified by the effects of the Sierra Nevada.

At the lower elevations, 4,200 to 5,000 feet, the precipitation is 5 to 8 inches. Weathering of parent material is slow, leaching is incomplete, and eluviation

and illuviation proceed at a very slow rate. The plant cover consists of drought-tolerant shrubs and grasses. Typically, the soils have a thin, light-colored A horizon. Soluble salts and carbonates accumulate at a shallow depth. Theon and Cleaver soils are typical soils that reflect these properties.

As elevation increases there is an accompanying increase in precipitation, which results in deeper leaching of salts and carbonates, lower reaction, and a thicker, darker-colored A horizon. The vegetation increases in density, height, and overall production. Old Camp, star, and Oppio soils exemplify this elevational-climatic relationship. At the highest elevations, where precipitation is 12 to 14 inches, leaching of salts and carbonates is more intensive. The soils are neutral or slightly acid, and their A horizon is thick and high in organic matter content. Burnborough, Tristan, and Indiano soils are typical.

### Relief

Relief, through its effects on drainage, runoff, erosion, and exposure to the sun and wind, has had an important effect on soil formation in the survey area. The mountain ranges, valleys, alluvial fans, and flood plains reflect the gross variations in relief within the area.

The mountain ranges are mainly characterized by steep relief. Runoff is rapid or very rapid, and the hazard of erosion is high. On unstable terrain the removal of material by erosion inhibits or prevents soil development. Smailcone soils exhibit this condition. An argillic horizon has formed in the soils on the more stable mountain surfaces, where the rate of geologic erosion has been slower. Indiano, Wedekind, and Nosrac soils formed on the more stable mountain slopes and have an argillic horizon.

Soils on concave north-facing mountain slopes, where the effectiveness of temperature and moisture is greater, support a dense stand of shrubs and grasses. The soils in these areas have developed a thick, dark-colored A horizon that has a high content of organic matter. Burnborough and Indiano soils are examples.

The valleys receive drainage water and runoff from the surrounding mountain ranges. In some areas the valleys are narrow and are characterized by very short alluvial fans, drainageways, and flood plains. Aquic Haploxeroils and Sagouspe soils are examples. In other areas the

valleys are broad and there are broad, stable surfaces on the fan piedmont remnants. Reno and Fulstone soils are examples. These areas have somewhat younger soils on the inset fans. Veta soils are an example.

## Biological Forces

Plants, animals, insects, and microflora are important biological forces that affect soil formation in the survey area. Although animals, such as badgers and ground squirrels, and insects, such as cicadas, have had some effect on soil development, plants appear to have had the major biological influence on the soils in this survey area.

The vegetation in the area has been a particularly important factor in reducing erosion. This factor has helped to maintain the stability of the land surfaces so that normal soil formation could take place.

Because of climatic differences, plants vary considerably in kinds and amounts as elevation increases. On basin-fill plains, terraces, and alluvial fans at low elevations, the main plants are drought- and salt-tolerant shrubs. Because of the scarcity of available moisture, plants cover only a small part of the surface. They add little organic matter to the soils and provide little protection from the wind and sun. Salt-tolerant shrubs also tend to recycle salts from the deeper layers to the upper layer.

Alluvial fans, terraces, and foothills at higher elevations support a plant cover of shrubs and grasses that is transitional from desert shrubs to mountain shrubs and grasses. The density of plants in these areas is somewhat greater, soluble salts are deeper in the soil profile, and more organic matter has accumulated in the A horizon.

The mountainous areas support denser stands of shrubs, grasses, and, in some places, trees. Because of the more abundant vegetation, the A horizon of the soils in these areas is thick, is high in organic matter content, and is dark in color.

## Parent Material

Parent material is the weathered rock or unconsolidated material from which soils form. The hardness, grain size, and porosity of the parent material and its mineralogic and chemical composition greatly influence soil formation. The main sources of parent material in the survey area are extrusive volcanic rock, sedimentary and metamorphic rock, colluvium, alluvium, and eolian sand.

The volcanic rock includes basalt, andesite, rhyolite, and silicic tuff. The material weathered from these rocks also is a component of the colluvium, alluvium, and basin-fill material in adjacent valleys (3). Volcanic rock contains appreciable quantities of minerals that weather to clay. The more siliceous rock, particularly tuff, is also a source of silica for the cementation of soil horizons.

Because of the ability of material derived from volcanic rock to produce clay upon weathering, most soils that formed in this material on stable mountain and foothill slopes have an argillic horizon. Oppio, Ristey, Theon, and Zephan soils are examples.

Colluvium is a soil parent material that has accumulated on steep mountain slopes as a result of gravitational forces. The colluvium generally is poorly sorted, contains many rock fragments, and includes minerals that weather to clay. Hefed soils are an example.

Tertiary sedimentary rock occurs extensively in the Chalk Hills area. This bedrock consists of old alluvial and lakebed deposits containing interbedded tuff and diatomaceous earth. The surficial material in which the major soils formed contains rock fragments and minerals capable of weathering to clay. The soils that formed on old stable surfaces over this sedimentary rock have an argillic horizon. Chalco soils are an example.

Alluvium deposited as alluvial fans, basin-fill plains, and flood plains consists of sandy, loamy, or clayey material of generally mixed mineralogy that has been eroded from surrounding mountains. Alluvium deposited as alluvial fans is mostly loamy textured and contains variable amounts of pebbles, cobbles, and stones. Silty and clayey material was deposited below the alluvial fans as basin-fill plains and flood plains. This material contains varying amounts of soluble salts that were incorporated into the sediment during deposition.

Alluvium deposited as alluvial fans is porous and contains minerals that, when weathered, produce clay and soluble silica for the cementation of duripans. Reno and Fulstone soils have an argillic horizon and a duripan and formed on alluvial fans.

Sandy and silty deposits on basin-fill plains and flood plains are not old enough to exhibit soil development. These materials, however, contain weatherable minerals and, given sufficient time, can be expected to form an argillic horizon.

Sandy eolian material is of limited extent in the survey area. It occurs mainly as dunes of Tertiary sediment along the Truckee River. The dunes consist of smooth, well-rounded fine sand. The source of the sand is the Tertiary alluvium that came down the river from the Sierra Nevada. Isalde and Patna soils are the only soils in the area that formed in eolian sand.

## Time

Time is required for the formation of soils. The amount of time required depends upon the other soil-forming factors. Thickness and other characteristics of the A and B horizons and other horizons reflect the relative age of soils. The age or strength of expression of the soil horizons is a reflection of the amount of weathering of parent material resulting from the interaction of moisture, temperature, and biological activity as influenced by time.

The soils in this survey area range from a few years to possibly a few hundred thousand years or more in age. This range in age is a major reason for the many kinds of soil in the area.

The interrelations between time and the other soil-forming factors are not well understood. Many soil scientists and some geologists feel that weathering of parent material and soil profile development have been essentially continuous, with little change in rate throughout Quaternary time (10, 11, 12, 17).

Recently earth scientists concerned with differentiating Quaternary deposits have proposed that soil development has not proceeded continuously at the same rate but has taken place intermittently at rapid rates (7, 8, 9). Concepts of soil stratigraphy use weathering profiles as stratigraphic markers to differentiate and correlate Quaternary deposits. These concepts of soil development are based on the assumption that weathering profiles formed in response to infrequent combinations of climatic factors that induced minimal erosion and deposition and a greatly accelerated rate of chemical weathering.

Although disagreements exist in regard to the relative influences of time and other soil-forming factors, the concept of intermittency of soil formation has been supported by numerous studies and provides a practical technique to discuss the age of soils in the survey area in relation to geologic and climatic factors in the Quaternary.

The kinds of diagnostic subsurface horizons and other subsurface diagnostic properties, together with their strength of expression, provide general clues to the age of the soils in the area. Important subsurface diagnostic horizons present in soils within the area include argillic and cambic horizons and horizons exhibiting silica cementation.

Prominent argillic horizons in this area occur generally only in soils that formed primarily during the Pleistocene. This concept has been established by studies in the Southwest (4, 5) and is further supported in Soil Taxonomy (14). With increasing age and constancy of other conditions, argillic horizons become finer in texture, become somewhat thicker, and tend to develop abrupt upper boundaries. Weakly expressed, thin argillic horizons may have formed during very late Pleistocene or early Holocene time.

Cambic horizons in soils within the area formed for the most part in calcareous sediment. Original stratification is absent and carbonates have been removed and redeposited in underlying horizons.

Investigations in southern New Mexico indicate that cambic horizons in that region are less than about 5,000 years old. Cambic horizons in the survey area and in

other areas in western Nevada generally have been thought to be less than 10,000 years old and possibly less than 7,000 years. This age has been determined mostly as a result of soil mapping in areas located below the last high stage of Pleistocene Lake Lahontan (6).

The volcanic glass in sediment derived from pyroclastic material and eolian deposits is a source of silica for the formation of duripans and durinodes in many of the soils in the survey area. Duripans are massive, platy horizons that are cemented with silica and with accessory calcium carbonate. Because of their association with prominent argillic horizons, massive duripans capped with silica- and lime-cemented laminar layers are probably the oldest kind of duripans in the area and are of late Pleistocene to mid-Pleistocene age. Platy or laminated forms of duripans with or without thin, discontinuous laminar layers are probably of late Pleistocene to early Holocene age. Platy laminar duripans tend to develop in loamy material. Thin duripans that do not have overlying laminar layers, weak discontinuous silica cementation, or durinodes may have developed on Holocene surfaces in loess or loamy alluvium deposited on gravelly material. These forms of silica cementation apparently are capable of forming during a relatively short period of time and may be less than 5,000 years old.

The degree of development of diagnostic subsurface horizons in the soils in the area indicates a sequence that ranges in age from the present to mid-Pleistocene or possibly older.

The youngest soils in the area are those that formed in recently aggraded material or in material recently exposed by erosion. Included among these soils are Mzel and Smallcone soils that formed in material weathered from volcanic tuff and altered andesite on upland slopes and Isalde soils on sand dunes. Sagoupe soils formed in sandy alluvium derived from granitic rock along the Truckee River.

Soils that have a cambic horizon are believed to be less than 5,000 years old. These include Veta and Haybourne soils that formed in deposits in drainageways and on alluvial fans.

Relict argillic and silica-cemented horizons of late Pleistocene age occur in soils on mountains, foothills, alluvial fans, and terraces. The fact that areas of these kinds of soil exist today is evidence that major erosional and depositional events have not taken place or have been minor in extent since late Pleistocene time.

Soils that have a relict argillic and silica-cemented horizon that is believed to be of late Pleistocene age are those of the Xeria, Fulstone, Reno, Cleaver, and Singdon series.



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# Glossary

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alkali (sodic) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted. The degrees of alkalinity are

	ESP
Nonalkali	Less than 15
Slightly alkali	15 to 40
Strongly alkali	More than 40

**Alluvial fan.** A semiconical, or fan-shaped, constructional major landform that is mainly stratified alluvium with debris flow deposits in some areas. It is on the upper margin of a piedmont slope, and its apex is a source of alluvium debouching from a mountain valley into an intermontane basin. Also a generic term for similar landforms in various other landscape positions.

**Alluvial flat.** The nearly level alluvial surface between a piedmont slope and the playa of a bolson or the axial-stream flood plain of a semibolson. This landform can include both recent and relict components.

**Alluvium.** Material such as sand, silt, or clay, deposited on land by streams.

**Association, soil.** A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

**Back slope.** The slope component that is the steepest, straight to concave or merely concave, middle part of an erosional slope.

**Badland.** Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from

25 to 500 feet. Runoff potential is very high and geologic erosion is active.

**Bar (offshore and barrier).** A component landform comprised of elongated, commonly curving, low ridges of well sorted sand and gravel that stand above the general level of a bolson floor. It is the result of the wave action of a Pleistocene lake.

**Basal area.** The area of a cross section of a tree. It is a measure of stand density commonly expressed in square feet. For pinyon pine and juniper stands it is the section at a height of 1 foot and is measured outside the bark.

**Base saturation.** The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

**Basin.** A general term for an intermontane basin, a bolson, a semibolson, an area of centripetal drainage, or a structural depression area.

**Basin floor.** The lowermost, nearly level major physiographic part of a bolson or semibolson. It includes all alluvial, eolian, and erosional landforms that are below the piedmont slopes.

**Basin-floor remnant.** A generally flat-topped erosional remnant of a basin floor that has been dissected by an axial stream.

**Beach plain.** A major landform of bolson floors comprised of numerous, closely spaced offshore bars and intervening lagoons. It is the result of a receding Pleistocene lake.

**Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

**Bolson.** An internally drained intermontane basin.

**Bolson floor.** The specific identification of the floor of a bolson, as compared with the floor of a semibolson both are basin floors.

**Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.

**Brush management.** Use of mechanical, chemical, or biological methods to reduce or eliminate competition of woody vegetation to a low understory grasses and forbs to recover, or to make conditions favorable for reseeding. It increases production of forage which reduces erosion. Brush management may improve the habitat for some species of wildlife.

**Calcareous soil.** A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

**Canopy.** The leafy crown of trees or shrubs. (See *Crown*.)

**Channel.** The bed of a single or braided waterway that commonly is barren of vegetation. Channels form in young alluvium. They may be enclosed by banks, or they may be spayed across a fan surface and slightly mounded above it. They may include bars and dumps, consisting of cobbles and stones. Channels, except flood plain playas, are landform elements.

**Chemical treatment.** Control of unwanted vegetation by use of chemicals.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay less than 45 percent sand, and less than 40 percent silt.

**Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

**Clay skin.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay film.

**Coarse textured soil.** Sand or loamy sand.

**Cobble (or cobblestone).** A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

**Cobbly soil material.** Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent cobble-sized rock fragments, and extremely cobbly soil material is more than 60 percent.

**Colluvium.** Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

**Complex, soil.** A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

**Component landform.** A feature of the Earth's surface that is part of a major landform and was created by partial dissection of the major landform or by alluvial or eolian accretion. A component landform is the smallest type of landform that can be described as a single unit. Its morphological parts are called landform elements, and a side slope element can be subdivided into slope components.

**Conglomerate.** A coarse grained, clastic rock composed of rounded to subangular rock fragments more than

2 millimeters in diameter. It commonly has a matrix of sand and finer material. Conglomerate is the consolidated equivalent of gravel.

**Conservation cropping system.** Growing crops in combination with needed cultural and management practices. If soil improving crops and practices used in the system more than offset the soil depleting crops and deteriorating practices, then it is a good conservation cropping system. Cropping systems are needed on all tilled soils. Soil improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

**Consistence, soil.** The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

*Loose.*—Noncoherent when dry or moist, does not hold together in a mass.

*Friable.*—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

*Firm.*—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

*Plastic.*—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

*Sticky.*—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

*Hard.*—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

*Soft.*—When dry, breaks into powder or individual grains under very slight pressure.

*Cemented.*—Hard; little affected by moistening.

**Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

**Coppice dune.** A small dune of fine-earth soil material stabilized around shrubs or small trees.

**Corrosive.** High risk of corrosion to uncoated steel or deterioration of concrete.

**Cover crop.** A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

**Crest.** The slope component comprising a very narrow, commonly linear top of a landform such as an erosional ridge, hill, or mountain.

**Crop residue management.** Returning crop residue to the soil, which helps to maintain soil structure.



organic matter content, and fertility and helps to control erosion.

**Cropping system.** Growing crops using a planned system of rotation and management practices.

**Crown.** The upper part of a tree or shrub, including the living branches and their foliage.

**Decreasers.** The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

**Deferred grazing.** Postponing grazing or arresting grazing for a prescribed period.

**Depth.** Soil depth is measured from the soil surface to a restrictive layer. The restrictive layer can be either a strongly cemented or indurated dunpan or soft or hard consolidated bedrock. In this survey the following depth classes are recognized:

	inches
Very shallow	Less than 10
Shallow	10 to 20
Moderately deep	20 to 40
Deep	40 to 60
Very deep	More than 60

**Desert pavement.** A layer of gravel or coarser fragments on a desert soil surface that was emplaced by upward movement of fragments from underlying sediment or remains after finer particles have been removed by running water or wind.

**Desert stream valley.** A valley cut through several desert semibolson by a perennial, mountain-fed stream.

**Desert varnish.** A glossy sheen or coating on stones and gravel in arid regions.

**Drainage class (natural).** Refers to the frequency and duration of periods of saturation or partial saturation during soil formation as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

*Excessively drained.*—These soils have very high and high hydraulic conductivity and low water holding capacity. They are not suited for crop production unless irrigated.

*Somewhat excessively drained.*—These soils have high hydraulic conductivity and low water holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

*Well drained.*—These soils have intermediate water holding capacity. They retain optimum amounts of moisture but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

*Moderately well drained.*—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless artificial drainage is provided. Moderately well drained soils

commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

*Somewhat poorly drained.*—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless artificial drainage is provided. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

*Poorly drained.*—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

*Very poorly drained.*—These soils are wet to the surface most of the time. They are wet enough to prevent the growth of important crops, except rice, unless artificially drained.

**Drainage, surface.** Runoff, or surface flow of water from an area.

**Draw.** A small stream valley generally more open and with broader bottom land than a ravine or gulch.

**Duff.** A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

**Effervescence.** The quality of a soil measured when drops of diluted (1:10) hydrochloric acid (HCl) are added to the soil. The ratings are as follows:

Very slightly effervescent	Few bubbles
Slightly effervescent	Bubbles readily
Strongly effervescent	Bubbles form low foam
Violently effervescent	Bubbles form thick foam quickly

**Eluviation.** The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial, those that have received material are illuvial.

**Eolian soil material.** Earthy parent material accumulated through wind action, commonly refers to sandy material in dunes or to loess blankets on the surface.

**Ephemeral stream.** A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source and its channel is above the water table at all times.

**Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

**Erosion (geologic).** Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

**Erosion (accelerated).** Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire that exposes the surface.

**Erosion pavement.** A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

**Escarpment.** A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and produced by erosion or faulting. Synonym: scarp.

**Extrusive rock.** Igneous rock derived from deep-seated molten matter (magma) emplaced on the Earth's surface.

**Fan apron.** A component landform consisting of a sheetlike mantle of relatively young alluvium that partially covers the surface of an older fan piedmont or, in some places, an alluvial fan. A fan apron buries a pedogenic soil.

**Fan piedmont.** The most extensive major landform of most piedmont slopes. It is formed by the lateral coalescence of mountain-front alluvial fans into one generally smooth slope and by accretion of fan aprons. Fan piedmonts commonly are complexes of many component landforms.

**Fan remnant.** A generic term for a component landform that is the remainder of various older fans that have been dissected (erosional fan remnants) or partially buried (nonburied fan remnants). Erosional fan remnants have a flatish summit that consists of a relict fan surface, nonburied fan remnants consist entirely of a relict fan surface.

**Fan remnant side slope.** A landform element comprised of the relatively young erosional slope around the sides of an erosional fan remnant. It is composed of shoulders, back slopes, and foot slopes.

**Fan skirt.** A major landform comprised of laterally coalescing small alluvial fans that originate from gullies that are cut into or extend from inset fans of a fan piedmont and merge along their toe slopes with the basin floor. Fan skirts are smooth or only slightly dissected.

**Fine textured soil.** Sandy clay, silty clay, and clay.

**Flood plain.** The transversely level floor of an axial stream of a semibolson or of a major desert stream valley that is occasionally or regularly alluviated by the stream overflowing its channel during periods of flooding.

**Flood-plain playa.** A component landform consisting of very low gradient, barren, axial stream segments in

an intermontane basin. It is subject to broad and shallow floods and is veneered with barren, fine textured sediment that crusts. A flood plain playa commonly is segmented by transverse, narrow bands of vegetation, and it may alternate with ordinary, narrow or braided channel segments.

**Foothill.** A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

**Foot slope.** The relatively gently sloping, slightly concave slope component of an erosional slope that is at the base of the back slope component. Synonym: pediment.

**Forb.** Any herbaceous plant not a grass or a sedge.

**Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

**Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

**Gravel.** Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

**Gravelly soil material.** Material that is 15 to 35 percent by volume, rounded or angular rock fragments not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter. Very gravelly soil material is 35 to 60 percent gravel-sized rock fragments, and extremely gravelly is more than 60 percent.

**Hard rock.** Rock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

**Hardpan.** A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by silica or calcium carbonate.

**Hill.** A natural elevation of the land surface rising as much as 1,000 feet above surrounding lowlands commonly of limited summit area and having a well-defined outline, hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

**Horizon, soil.** A layer of soil approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows.

**O horizon.**—An organic layer of fresh and decaying plant residue.

**A horizon.** The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material.

Also a plowed surface horizon, most of which was originally part of a B horizon.

**B horizon.**—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these, (2) prismatic or blocky structure, (3) redder or browner colors than those in the A horizon, or (4) a combination of these.

**E horizon.**—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

**C horizon.**—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

**R layer.**—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

**Hydrologic soil groups.** Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors of predicting runoff. The four hydrologic groups are:

**Group A.**—Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

**Group B.**—Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

**Group C.**—Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

**Group D.**—Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

**Igneous rock.** Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

**Illuviation.** The movement of soil material from one horizon to another in the soil profile. Generally material is removed from an upper horizon and deposited in a lower horizon.

**Infiltration.** The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

**Inset fan.** The flood plain of a commonly ephemeral stream that is confined between fan remnants, basin floor remnants, ballenas, or closely opposed fan toe slopes. Its transversely level cross section is evidence of alluviation of a fluvial. It is wide enough that raw channels cover only a fraction of its surface.

**Intermittent stream.** A stream, or reach of a stream that flows for prolonged periods only when it receives ground water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

**Irrigation.** Application of water to soils to assist in production of crops.

**Lacustrine deposit (geology).** Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

**Lake plain.** A major landform of some bolson floors that is nearly level and consists of fine textured, stratified bottom sediment of a Pleistocene lake.

**Lake-plain terrace.** A somewhat elevated area and component landform of a lake plain.

**Landform element.** The morphological part of a component landform. Side slope landform elements may be divided into slope components.

**Leaching.** The removal of soluble material from soil or other material by percolating water.

**Light textured soil.** Sand and loamy sand.

**Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

**Loess.** Fine grained material, dominantly of silt-sized particles, deposited by wind.

**Low strength.** The soil is not strong enough to support loads.

**Major landform.** A subdivision of the piedmont slope or basin floor major physiographic part that reflects a major morphogenetic process taking place over a long period of time or that is the result of a special erosional or depositional process. Many major landforms are dissected, and their original areas occupied by component landforms.

**Major physiographic part.** The very large part of an intermontane basin that is characterized by dominant slope and position and is comprised of major landforms (i.e., steeply sloping mountains that stand above less sloping piedmonts that in turn grade to nearly level basin floors)

**Mechanical treatment.** Use of mechanical equipment for seeding, brush management, and other management practices

**Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt

**Metamorphic rock.** Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline

**Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.

**Moderately coarse textured soil.** Coarse sandy loam, sandy loam, and fine sandy loam

**Moderately fine textured soil.** Clay loam, sandy clay loam, and silty clay loam

**Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 mm (millimeters) (about 0.2 inch); *medium*, from 5 to 15 mm (about 0.2 to 0.6 inch); and *coarse*, more than 15 mm (about 0.6 inch)

**Mountain.** A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides and considerable bare-rock surface. A mountain can occur as a single isolated mass or in a group forming a chain or range

**Mountain-valley fan.** A major landform that is the result of a fluvial filling of a mountain valley or intramontane basin by coalescent valley-side slope fans whose toe slopes meet from either side of the valley along an axial drainageway. It is an extension of the upper piedmont slope into mountain valleys. Most mountain-valley fans have been dissected.

**Mudstone.** Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

**Munsell notation.** A designation of color by degrees of the three simple variables—hue, value, and chroma

For example, a notation of 10YR 5/4 is a color in hue of 10YR, value of 5, and chroma of 4

**Neutral soil.** A soil having a pH value between 6.6 and 7.3. (See Reaction, soil)

**Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water

**Observed rooting depth.** Depth to which roots have been observed to penetrate

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition

**Pan.** A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan* or *claypan*

**Parent material.** The unconsolidated organic and mineral material in which soil forms

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Pediment.** The foot slope component of an erosional slope

**Pedon.** The smallest volume that can be called 'a soil'. A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil

**Percolation.** The downward movement of water through the soil

**Permeability.** The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow.....	Less than 0.05 inch
Slow.....	0.05 to 0.2 inch
Moderately slow.....	0.2 to 0.6 inch
Moderate.....	0.6 inch to 2.0 inches
Moderately rapid.....	2 to 6 inches
Rapid.....	6 to 20 inches
Very rapid.....	More than 20 inches

**Phase, soil.** A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness

**pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil)

**Plain.** A flat, undulating or rolling area, large or small, that includes few prominent hills or valleys. It generally is at a low elevation in relation to surrounding areas, and it may have considerable overall slope and local relief.

**Playa.** An ephemerally flooded, barren area on a basin floor that is veneered with fine textured sediment

and acts as a temporary or final sink for drainage water.

**Piping.** Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Ponding.** Standing water on soils in closed depressional areas. The water can be removed only by percolation or evapotranspiration.

**Poorly graded.** Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

**Potential native plant community.** The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

**Potential rooting depth (effective rooting depth).**

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

**Prescribed burning.** The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Proper grazing use.** Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This increases the vigor and reproduction of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

**Rangeland.** Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

**Range condition.** The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

**Range site.** An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible

for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

**Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

**Relict.** Old, or remaining from previous times; in the present context, of Pleistocene age.

**Relief.** The elevations or inequalities of a land surface, considered collectively.

**Remnant.** The remainder of a larger landform or of a land surface that has been dissected or partially buried.

**Residuum (residual soil material).** Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

**Ridgeline remnant.** A narrow ridge that has a fully rounded crest and is accordant with the crests of similar nearby ridges. Together these accordant crests approximately mark the position of a pre-existing land surface that has been destroyed by dissection.

**Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more, for example pebbles, cobbles, stones, and boulders.

**Root zone.** The part of the soil that can be penetrated by plant roots.

**Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water. Six classes of runoff are recognized:

**Ponded.**—Little of the precipitation and runoff escapes as runoff and free water stands on the surface for significant periods. The amount of water that must be removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs in level to nearly level depressional areas, and the water depth may fluctuate greatly.

**Very slow.**—Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils commonly are level or nearly level, or are very open and porous.

**Slow.**—Surface water flows away slowly enough that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils commonly are either nearly level or very gently sloping or they are steeper but absorb precipitation very rapidly.

**Medium.**—Surface water flows away fast enough that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils commonly are either nearly level or gently sloping and absorb precipitation at a moderate rate or they are steeper but absorb water rapidly.

**Rapid.**—Surface water flows away fast enough that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly moderately steep or steep, and they have a moderate to slow rate of absorption.

**Very rapid.**—Surface water flows away so fast that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep, and they absorb precipitation slowly.

**Runon.** Soil moisture received as runoff from adjacent areas.

**Saline soil.** A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium. The conductivity of extract, in millimhos per centimeter, is expressed as—

	Moisture has
Nonsaline	0 to 4
Slightly saline	4 to 8
Moderately saline	8 to 16
Strongly saline	More than 16

**Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

**Sand dune.** A component landform made up of eolian sand-sized mineral particles. Dunes commonly are on the leeward side of a Pleistocene lakebed.

**Sand sheet.** A major landform comprising an extensive, several-foot thick layer of eolian sand from pluvial lake beaches, sometimes partly redeposited by water. It is spread across alluvial flats, onto

piedmont slopes, or even over low mountains and has an undulating and commonly duned surface.

**Sandstone.** Sedimentary rock containing dominantly sand-size particles.

**Sedimentary rock.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

**Semibolson.** An externally drained intermontane basin. **Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Shale.** Sedimentary rock formed by the hardening of a clay deposit.

**Shoulder.** The convex slope component at the top of an erosional side slope.

**Side slope.** The erosional slope around the sides of an erosional fan remnant, hill, butte, or mountain, etc. It is composed of shoulders, back slopes, foot slopes, and toe slopes. Also, the planimetrically linear parts of the slopes around a diglately dissected fan remnant or hill, or other landform as compared with the planimetrically convex nose slope and concave head slope parts.

**Silica.** A combination of silicon and oxygen. The mineral form is called quartz.

**Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Siltstone.** Sedimentary rock made up of dominantly silt-sized particles.

**Site index.** A designation of the quality of a forest site. For pinyon pine and juniper stands, it is based on tree diameter at a height of 1 foot height and the spacing between trees.

**Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey the following slope classes are recognized:

	Percent
Nearly level	0 to 2
Gently sloping	2 to 4
Moderately sloping	4 to 8
Strongly sloping	8 to 15
Moderately steep	15 to 30
Steep	30 to 50

Very steep ————— 50 to 75  
Extremely steep ————— More than 75

**Slope component.** A morphological element of an erosional slope and a morphological subdivision of the side slope landform element.

**Sodic (alkali) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

**Sodicity.** The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium absorption ratio (SAR) of a saturation extract, or the ratio of  $\text{Na}^+$  to  $\text{Ca}^{++} + \text{Mg}^{++}$ . The degrees of sodicity are—

SAR

Non-sodic ————— Less than 13  
Slightly sodic ————— 13 to 46  
Strongly sodic ————— More than 46

**Soft rock.** Rock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

**Soil.** A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material as conditioned by relief over periods of time.

**Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows.

Millimeters

Very coarse sand ————— 2.0 to 1.0  
Coarse sand ————— 1.0 to 0.5  
Medium sand ————— 0.5 to 0.25  
Fine sand ————— 0.25 to 0.10  
Very fine sand ————— 0.10 to 0.05  
Silt ————— 0.05 to 0.002  
Clay ————— Less than 0.002

**Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

**Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 6 to 15 inches (15 to 38 centimeters) in length if flat.

**Stoniness.** A measure of the stones on the soil surface, including both those that lie on the surface and those that are partly in the soil but protrude above the surface. Terms describing stoniness are:

**Nonstony.**—Stones cover less than 0.1 percent of the soil surface. The smaller sized stones are at least 8 meters apart.

**Stony.** Stones cover 0.1 to 3.0 percent of the soil surface. The smaller sized stones are at least 1 meter apart.

**Very stony.**—Stones cover 3 to 15 percent of the soil surface. The smaller sized stones are at least 0.5 meter apart.

**Extremely stony.**—Stones cover 15 to 50 percent of the soil surface. The stones are so closely spaced that in most places it is possible to step from stone to stone without touching the soil surface.

**Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage.

**Stony soil material.** Material, commonly a subsurface layer, that is 15 to 35 percent, by volume, rock fragments that are mainly 10 to 24 inches (25 to 60 centimeters) in diameter. Very stony soil material is 35 to 60 percent stone-sized fragments, and extremely stony soil material is more than 60 percent.

**Stream terrace.** A transversely level erosional remnant of a former axial stream or major desert stream flood plain that slopes in the same direction as the adjacent, incised stream and is underlain by well-sorted, stratified sand and gravel or by loamy or clayey sediment.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular) and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage as in many hardpans).

**Summit.** The flatish top of an erosional remnant hill, mountain, or other landform. The term is used for both a landform element and a slope component.

**Tail water.** The water just downstream of a structure.

**Talus.** Rock fragments of any size or shape commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

**Taxadjuncts.** Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

**Terrace.** Any part of a general slope that stands above a short, steep scarp and has a generally flat, nearly



level or gently sloping summit. It may have another short scarp above the summit. Synonym: bench.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

**Toe slope.** The lowest part of a foot slope component of an erosional slope. It is distinguished from the upper part of a foot slope by a greater accumulation of pedisegment. Also, the lowest and most gently sloping part of a slope.

**Tuff.** A compacted deposit that is 50 percent or more volcanic ash and dust.

**Valley.** An elongated depressional area cut by stream erosion and the associated water erosion of its side slopes (stream valley). Also used for intermontane basins.

**Variant, soil.** A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

**Variegation.** Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

**Water supplying capacity.** The total amount of water available in the soil for plant growth in a normal year from precipitation, from runoff, and from a capillary fringe minus runoff.

**Water table.** The upper level of ground water or that level below which the soil is saturated.

**Water table (perched).** The water table of a saturated layer of soil that is separated from an underlying saturated layer by an unsaturated layer.

**Weathering.** All physical and chemical changes produced in rocks or other deposits at or near the Earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.



## Tables

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TABLE 1.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name		Inclusion number--		
		Bombadil	Indiana	1	2	3
Fine bluegrass	POSC	5-15	---	---	---	---
Indian bluegrass	OW Y	5-15	---	5-10	---	---
Portulacanthus sp. xreltail	STH	5-10	2-5	5-10	---	2-5
Needlegrass	STIPA	2-10	25-40	---	---	25-40
Haystack lily	ELC L	---	10-20	---	---	10-20
Bluegrass	POA**	---	5-10	5-15	---	5-10
Thorny needlegrass	STTH	---	---	20-40	---	---
Other perennial grasses	PPCG	5-10	5-10	5-10	---	5-10
Perennial forbs	PPFF	5-10	5-15	5-10	---	5-15
Annual forbs	AAFF	---	1-3	1-3	---	1-3
Wyoming big sagebrush	ARTW*	10-20	5-15	---	---	5-15
Sagebrush	GRSP	10-20	---	---	---	---
Nevada sagebrush	EPNT	5-10	---	---	---	---
Antelope bitterbrush	B-TR	---	5-10	---	---	5-10
Low sagebrush	APAR*	---	---	10-20	---	---
Flowering horsebrush	TH	---	---	2-5	---	---
Other shrubs	SSSS	5-15	5-10	5-10	---	5-10
Trees	TTTT	---	2-2	---	---	T-2
Range site symbol		027X005N	026X010N	026X025N	---	026X010N
Potential production lb/acre:						
Favorable years		700	900	400	---	900
Normal years		500	700	300	---	700
Unfavorable years		300	600	200	---	600

TABLE 2.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions					
		Component name			Inclusion number--		
		Old Camp	Hefed	Rock outcrop	1	2	3
Desert needlegrass	STSP3	15-25	15-25	---	---	---	20-40
Bottlebrush squieretail	SDNY	5-10	5-10	---	---	5-10	2-5
Thurber needlegrass	STTH2	2-5	2-5	---	---	5-10	---
Bluegrass	POA++	---	---	++	---	5-15	---
Indian ricegrass	ORRY	---	---	---	---	5-10	5-10
Sandberg bluegrass	POSE	---	---	---	---	---	2-5
Other perennial grasses	PPGG	2-5	2-5	---	---	5-10	2-5
Perennial forbs	PPFF	5-10	5-10	---	---	5-10	5-10
Annual forbs	AAFF	2-5	2-5	---	---	3-3	---
Wyoming big sagebrush	ARTRW*	15-20	15-20	---	---	---	---
Green aphedra	EPVI	5-15	5-15	---	---	---	---
Douglas rabbitbrush	CHV18	2-5	2-5	---	---	---	---
Spiny hopsage	GRSP	2-5	2-5	---	---	---	---
Low sagebrush	ARARS	---	---	---	---	10-20	---
Littleleaf horsebrush	TEGL	---	---	---	---	2-5	10-20
Shadscale	ATCO	---	---	---	---	---	5-15
Other shrubs	SSSS	2-5	2-5	---	---	5-10	5-15
Juniper	JUNIP	2-5	2-5	---	---	---	---
Range site symbol		026X022N	026X022N	---	---	026X025N	027X017N
Potential production (lb/acre):							
Favorable years		600	600	---	---	400	400
Normal years		450	450	---	---	300	200
Unfavorable years		300	300	---	---	200	100

TABLE 3.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions				
		Component name			Inclusion number--	
		Old Camp	Rubble land	Rock outcrop	1	2
Desert needlegrass	STSP3	15-25	---	---	15-25	---
Bottlebrush squirreltail	SINY	5-10	---	---	5-10	5-10
Thurber needlegrass	STCH2	2-5	---	---	2-5	20-40
Bluegrass	POA++	---	---	---	---	5-15
Indian needlegrass	ORHY	---	---	---	---	5-10
Other perennial grasses	PPGG	2-5	---	---	2-5	5-10
Perennial forbs	PPFP	5-10	---	---	5-10	5-10
Annual forbs	AAFP	2-5	---	---	2-5	1-3
Wyoming big sagebrush	ARTRW+	15-20	---	---	15-20	---
Green ephedra	EPV1	5-15	---	---	5-15	---
Douglas rabbitbrush	CHV18	2-5	---	---	2-5	---
Spiny hopsage	GRSP	2-5	---	---	2-5	---
Low sagebrush	ARARS	---	---	---	---	10-20
Littleleaf horsebrush	TEGL	---	---	---	---	1-5
Other shrubs	SSSS	2-5	---	---	2-5	5-10
Juniper	JUNIP	2-5	---	---	2-5	---
Range site symbol		026X022N	---	---	026X022N	026X025N
Potential production (lb/acre):						
Favorable years		600	---	---	610	400
Normal years		450	---	---	450	300
Unfavorable years		300	---	---	300	200

TABLE 4.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions						
		Soil name			Inclusion number--			
		Old Camp	Olac	Indiano	1	2	3	4
Desert needlegrass	STSP3	15-25	---	---	---	---	---	---
Bottlebrush squirttail	SIHY	5-10	5-10	2-5	2-5	2-5	5-10	---
Thurber needlegrass	STML	2-5	20-40	---	---	---	15-35	---
Bluegrass	POA+	---	5-15	5-10	5-10	5-10	10-20	---
Indian ricegrass	ORHY	---	5-10	---	---	---	---	---
Needlegrass	STIPA	---	---	25-40	25-40	25-40	---	---
Basin wildrye	ELI12	---	---	10-20	10-20	10-20	---	---
Other perennial grasses	PPG3	2-5	5-10	5-10	5-10	5-10	5-10	---
Perennial forbs	PPFF	5-10	5-10	5-15	5-15	5-15	5-15	---
Annual forbs	AAFF	2-5	1-3	1-3	1-3	1-3	2-5	---
Wyoming big sagebrush	ANTRM*	15-20	---	5-15	5-15	5-15	---	---
Green ephedra	EPVI	5-15	---	---	---	---	---	---
Douglas rabbitbrush	CHV18	2-5	---	---	---	---	2-5	---
Spiny hopsage	GRSP	2-5	---	---	---	---	---	---
Low sagebrush	ASARB	---	10-20	---	---	---	---	---
Littleleaf horsebrush	TEGL	---	2-5	---	---	---	---	---
Antelope bitterbrush	PATR2	---	---	5-10	5-10	5-10	2-5	---
Low sagebrush	ARARB	---	---	---	---	---	5-20	---
Other shrubs	SSSS	2-5	5-10	5-10	5-10	5-10	1-5	---
Juniper	JUNIP	2-5	---	---	---	---	---	---
Other trees	TTTT	---	---	T-2	T-2	T-2	---	---
Range site symbol		026X022N	026X025N	026X010N	026X010N	026X010N	026X023N	---
Potential production (lb/acre):								
Favorable years		600	400	900	900	900	500	---
Normal years		450	300	700	700	700	400	---
Unfavorable years		300	200	600	600	600	300	---

TABLE 5.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name		Inclusion number--		
		Cleaver	Stringdown	1	2	3
Indian ricegrass	ORNY	10-20	10-20	---	---	---
Bottlebrush squirttail	SIHY	5-10	5-10	---	5-10	---
Sandberg bluegrass	POSE	---	---	2-5	---	---
Basin wildrye	ELCI2	---	---	2-5	---	---
Desert needlegrass	STSP3	---	---	---	15-25	---
Thurber needlegrass	STTH2	---	---	---	2-5	---
Other perennial grasses	PPGG	2-5	2-5	10-25	2-5	---
Perennial forbs	PPFF	3-7	3-7	2-5	5-10	---
Annual forbs	AAFF	2-5	2-5	2-5	2-5	---
Shadscale	ATCO	15-30	15-30	---	---	---
Bailey greasewood	SAVEB	5-30	5-30	---	---	---
Red sagebrush	ARSP5	5-15	5-15	---	---	---
Big sagebrush	ARTR2	---	---	10-30	---	---
Rabbitbrush	CHRY59	---	---	10-30	---	---
Spiny hopsage	GRSP	---	---	10-20	2-5	---
Wyoming big sagebrush	ARTRH*	---	---	---	15-20	---
Green ephedra	EPVI	---	---	---	5-15	---
Douglas rabbitbrush	CHVI6	---	---	---	2-5	---
Other shrubs	SSSS	5-10	5-10	5-15	2-5	---
Juniper	JUN1P	---	---	---	2-5	---
Range site symbol		027X018N	027X018N	027X029N	026X022N	---
Potential production (lb/acre):						
Favorable years		500	500	600	600	---
Normal years		300	300	500	450	---
Unfavorable years		100	100	100	300	---

TABLE 6.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

(Absence of an entry indicates that the named plant is not a key species in the potential native plant community)

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name		Inclusion number
		Cleaver	Veta	1
Indian wildgrass	INDY	10-20	5-15	10-20
Bottlebrush squirreltail	SIHY	5-10	---	5-10
Desert needlegrass	STSP3	---	2-5	---
Other perennial grasses	PPGG	2-5	---	2-5
Perennial forbs	PPFF	3-	1-3	3-7
Annual forbs	AAFF	1-6	1-2	2-5
Shadscale	ATCO	5-30	---	15-30
Bailey greasewood	BAVEP	5-30	---	5-30
Red sagebrush	ARSP5	5-5	---	5-15
Wyoming big sagebrush	WYBWS*	---	2"-4"	---
Sage big sage	BSB*	---	15-30	---
Other shrubs	SSSS	5-10	2-5	5-10
Range % to symbol		02X01KN	02X024N	02X018N
Potential production (lb/acre)				
Favorable years		500	400	500
Normal years		300	300	300
Unfavorable years		100	200	100

TABLE 7.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions						
		Soil name			Inclusion number--			
		Wadekind	Xman	Indiana	1	2	3	4
Thurber needlegrass	STTH2	20-35	20-40	---	15-35	---	---	---
Bottlebrush squirreltail	SIHY	10-15	5-10	2-5	5-10	5-10	---	---
Indian ricegrass	ORHY	5-10	5-10	---	---	5-10	---	---
Sagebrush wildrye	ELC12	5-10	---	10-20	---	---	---	---
Bluegrass	POA++	---	5-15	5-10	10-20	---	---	---
Needlegrass	STIPA	---	---	25-40	---	10-15	---	---
Other perennial grasses	PPGG	5-10	5-10	5-10	5-10	2-5	---	---
Perennial forbs	PPFP	5-12	5-10	5-15	5-15	5-10	---	---
Annual forbs	AAPP	2-5	1-3	1-3	2-5	1-5	---	---
Wyoming big sagebrush	ARTRW*	10-15	---	5-15	---	15-20	---	---
Antelope bitterbrush	PUTR2	5-10	---	5-10	2-5	5-10	---	---
Douglas rabbitbrush	CHVT8	2-5	---	---	2-5	5-10	---	---
Green sphaerolobos	EPV1	2-5	---	---	---	---	---	---
Low sagebrush	AFAR6	---	10-20	---	5-20	---	---	---
Littleleaf horsebrush	TEGL	---	2-5	---	---	---	---	---
Purple sage	SACA9	---	---	---	---	5-10	---	---
Other shrubs	SSSS	2-10	5-10	5-10	1-5	2-5	---	---
Trees	TTTT	1-2	---	1-2	---	2-5	---	---
Range site symbol		D26X015N	O26X025N	O26X010N	O26X023N	O26X029N	---	---
Potential production (lb/acre):								
Favorable years		700	400	900	500	200	---	---
Normal years		600	300	700	400	150	---	---
Unfavorable years		450	200	600	300	100	---	---



TABLE B.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter T means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name		Inclusion number--		
		Springmeyer	Feno	1	2	3
Needlegrass	STIPA	25-40	---	---	25-40	---
Basin wildrye	ELC12	10-20	---	---	10-20	15-20
Bluegrass	POA++	5-10	10-20	10-20	5-20	---
Bottlebrush squirreltail	SIHY	2-5	5-10	5-10	2-5	---
Thurber needlegrass	STTR2	---	15-35	15-35	---	---
Creeping wildrye	ELTR3	---	---	---	---	40-60
Nevada bluegrass	PONE3	---	---	---	---	5-10
Other perennial grasses	PPGG	5-10	5-10	5-10	5-10	2-5
Perennial forbs	PPFF	5-15	5-15	5-15	5-15	5-15
Annual forbs	AAFF	1-3	2-5	2-5	1-3	---
Wyoming big sagebrush	ARTRW*	5-15	---	---	5-15	---
Antelope bitterbrush	PATR2	5-10	2-5	2-5	5-10	---
Low sagebrush	ARAR8	---	5-20	5-20	---	---
Douglas rabbitbrush	CHV18	---	1-5	2-5	---	---
Other shrubs	SSSS	5-10	1-5	1-5	5-10	5-15
Willow	SALIX	---	---	---	---	2-5
Cottonwood	POPUL	---	---	---	---	2-5
Other trees	TITT	T-2	---	---	T-2	---
Range site symbol		026X010N	026X023N	026X023N	026X010N	026X001N
Potential production (lb/acre):						
Favorable years		900	500	500	900	3,000
Normal years		700	400	400	700	2,500
Unfavorable years		600	300	300	600	2,000

TABLE 9.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name		Inclusion number--
		Oppl0	Mostrac	1
Thurber needlegrass	STTH2	20-40	---	15-35
Bluegrass	POA++	5-15	5-10	10-20
Indian ricegrass	ORHY	5-10	---	---
Bottlebrush squirreltail	SIHY	5-10	---	5-10
Needlegrass	ST1PA	---	20-35	---
Mountain brome	BRMA4	---	10-20	---
Basin wildrye	ELC12	---	10-20	---
Other perennial grasses	PPGG	5-10	5-15	5-10
Perennial forbs	PPFF	5-10	5-15	5-15
Annual forbs	AAFF	1-3	2-5	2-5
Low sagebrush	ARAB8	10-20	---	5-20
Littleleaf horsebrush	TEGL	2-5	---	---
Antelope bitterbrush	PUTR2	---	5-15	2-5
Mountain big sagebrush	ARTRV	---	5-10	---
Douglas rabbitbrush	CHV18	---	---	2-5
Other shrubs	SSSS	5-10	5-15	1-5
Range site symbol		026X025N	026X005N	026X023N
Potential production (lb/acre):				
Favorable years		400	1,500	500
Normal years		300	1,100	400
Unfavorable years		200	800	300

TABLE 10.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name			Inclusion number--	
		Opplc	Reywat	Indiano	1	2
Thurber needlegrass	STTH2	20-40	20-35	---	---	---
Bluegrass	POA++	5-15	---	5-10	5-10	---
Indian ricegrass	ORHY	5-10	5-10	---	---	---
Bottlebrush squirreltail	SIHY	5-10	10-15	2-5	2-5	---
Basin wildrye	ELW12	---	5-10	10-20	10-20	---
Needlegrass	STIPA	---	---	25-40	25-40	---
Other perennial grasses	PRGG	5-10	5-10	5-10	5-10	---
Perennial forbs	PPFP	5-10	5-12	5-15	5-15	---
Annual forbs	AAFP	1-3	2-5	1-3	1-3	---
Low sagebrush	ARAB8	10-20	---	---	---	---
Littleleaf horsebrush	TEGL	2-5	---	---	---	---
Wyoming big sagebrush	ARTRW*	---	10-15	5-15	5-15	---
Antelope bitterbrush	PBTR2	---	5-10	5-10	5-10	---
Douglas rabbitbrush	CHV18	---	2-5	---	---	---
Green aphodra	EPV1	---	2-5	---	---	---
Other shrubs	SSSS	5-10	2-10	5-10	5-10	---
Trees	TTTT	---	T-2	T-2	T-2	---
Range site symbol		026X025N	026X015N	026X010N	026X010N	---
Potential production (lb/acre):						
Favorable years		400	700	900	900	---
Normal years		300	600	700	700	---
Unfavorable years		200	450	600	600	---

TABLE II. RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions					
		Soil name			Inclusion number--		
		Triatan	Duco	Zephyr	1	2	3
Needlegrass	STIPA	15-40	X	---	---	25-40	---
Basin wildrye	ELCI2	5-15	---	---	---	10-20	---
Squirreltail	SI*AA	5-10	---	---	---	---	---
Pine bluegrass	POSC	---	X	---	---	---	---
Indian ricegrass	ORHY	---	X	5-10	---	---	---
Hottlebrush squirreltail	SIMY	---	X	5-10	5-10	2-5	---
Thurber needlegrass	STW2	---	---	20-40	2-5	---	---
Bluegrass	PCA+	---	---	5-15	---	5-10	---
Desert needlegrass	STSP3	---	---	---	15-25	---	---
Other perennial grasses	PPGG	5-15	X	5-10	2-5	5-10	---
Perennial forbs	PPFF	5-10	X	5-10	5-10	5-15	---
Annual forbs	AAFF	2-5	X	1-3	2-5	1-3	---
Mountain big sagebrush	ARTRV	5-10	X	---	---	---	---
Antelope bitterbrush	PUTR2	5-10	X	---	---	5-10	---
Green ephedra	EPVI	5-8	X	---	5-15	---	---
Curry	RIMES	2-5	---	---	---	---	---
Low sagebrush	ARAP8	---	---	10-20	---	---	---
Littleleaf horsetrush	TEC	---	---	2-5	---	---	---
Wyoming big sagebrush	ARTRW*	---	---	---	15-20	5-15	---
Douglas rabbitbrush	CHV18	---	---	---	2-5	---	---
Sage hopsgage	CRSP	---	---	---	2-5	---	---
Other shrubs	BSSS	5-15	X	5-10	2-5	5-10	---
Singleleaf pinyon	PINO	---	X	---	---	---	---
Utah juniper	JUOS	---	X	---	---	---	---
Juniper	JUNIP	---	---	---	2-5	---	---
Other trees	TTTT	---	---	---	---	T=2	---
Range site symbol		026X048N	---	026X025N	026X022N	026X010N	---
Woodland site symbol		---	026X060N	---	---	---	---
Potential production (lb/acre):							
Favorable years		900	300	400	600	900	---
Normal years		700	225	300	450	700	---
Unfavorable years		450	150	200	300	600	---

TABLE 12.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions					
		Soil name			Inclusion number--		
		Tristan	Burnborough	Gabica	1	2	3
Needlegrass	STIPA	25-40	20-35	10-25	10-25	---	---
Basin wild-rye	ELC**2	10-20	10-20	---	---	---	---
Bluegrass	POA**	5-10	5-10	5-10	5-10	---	---
Bottlebrush squirttail	SINNY	2-5	---	---	---	---	---
Mountain brome	BRMA4	---	10-20	---	---	---	---
Prairie junegrass	KOGR	---	---	2-5	2-5	---	---
Other perennial grasses	PRGR	5-10	5-15	10-15	10-15	---	---
Perennial forbs	PPFF	5-15	5-15	5-15	5-15	---	---
Annual forbs	AAPF	1-3	2-5	2-5	2-5	---	---
Wyoming big sagebrush	ARTRW*	5-15	---	---	---	---	---
Antelope bitterbrush	PUTR2	5-10	5-15	---	---	---	---
Mountain big sagebrush	ARTRV	---	5-10	---	---	---	---
Low sagebrush	ARARS	---	---	20-30	20-30	---	---
Other shrubs	SSSE	5-10	5-15	5-15	5-15	---	---
Trees	TTTT	T-2	---	---	---	---	---
Range site symbol		026X010N	026X005N	026X028N	026X028N	---	---
Potential production (lb/acre):							
Favorable years		900	1,500	350	350	---	---
Normal years		700	1,100	250	250	---	---
Unfavorable years		600	800	150	150	---	---

TABLE 13.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions			
		Soil name		Inclusion number--	
		Devada	Rock outcrop	1	2
Thurber needlegrass	STTH2	15-35	---	2-5	---
Bluegrass	POA++	10-20	---	---	---
Bottlebrush squirreltail	SIHY	5-10	---	5-10	---
Desert needlegrass	STSP3	---	---	15-25	---
Other perennial grasses	PPGG	5-10	---	2-5	---
Perennial forbs	PPFP	5-15	---	5-10	---
Annual forbs	AAFP	2-5	---	2-5	---
Low sagebrush	ARAK5	5-20	---	---	---
Antelope bitterbrush	PUTR2	2-5	---	---	---
Douglas rabbitbrush	CHV18	2-5	---	2-5	---
Wyoming big sagebrush	APTWH*	---	---	15-20	---
Green sp. sage	ESV1	---	---	5-15	---
Spiny hopsage	GRSP	---	---	2-5	---
Other shrubs	SSSS	1-5	---	2-5	---
Juniper	JUNIP	---	---	2-5	---
Range site symbol		026X023M	---	026X022M	---
Potential production (lb/acre):					
Favorable years		500	---	600	---
Normal years		400	---	450	---
Unfavorable years		300	---	300	---

TABLE 14.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name		Inclusion number--		
		Devada	Nevada	1	+	2
Thurber needlegrass	STTH2	15-35	---	20-35	20-35	---
Bluegrass	POA++	10-20	5-10	---	---	---
Bottlebrush squirreltail	SIHY	5-10	---	0-5	10-15	---
Needlegrass	STIPA	---	70-80	---	---	---
Mountain brome	BRMA4	---	10-20	---	---	---
Basin wildrye	ELCI2	---	10-20	5-10	5-10	---
Indian ricegrass	ORRY	---	---	5-10	5-10	---
Other perennial grasses	PRGG	5-10	5-15	5-10	5-10	---
Perennial forbs	PPFF	5-15	5-15	5-10	5-10	---
Annual forbs	AAPP	2-5	2-5	2-5	2-5	---
Low sagebrush	ARAB2	5-20	---	---	---	---
Antelope bitterbrush	PIBR2	2-5	5-15	5-10	5-10	---
Douglas rabbitbrush	CHLS	2-5	---	2-5	2-5	---
Mountain big sagebrush	APBRV	---	5-10	---	---	---
Syntherisma big sagebrush	ARTRW+	---	---	10-15	10-15	---
Green ephedra	ELVI	---	---	2-5	2-5	---
Other shrubs	SSSS	1-5	5-15	2-10	2-10	---
Trees	TTTT	---	---	T-2	T-2	---
Range site symbol		026X023N	026X003N	026X013N	026X015N	---
Potential production (lb/acre):						
Favorable years		500	1,500	700	700	---
Normal years		400	1,100	600	600	---
Unfavorable years		300	800	450	450	---

TABLE 15.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions					
		Soil name			Inclusion number--		
		Devada	Oiac	Old Camp	1	2	3
Thurber needlegrass	STTH2	15-35	20-40	2-5	---	---	---
Bluegrass	POA++	10-20	5-15	---	---	---	---
Bottlebrush squirreltail	SIHY	5-10	5-10	5-10	---	---	---
Indian ricegrass	ORHY	---	5-10	---	---	---	---
Desert needlegrass	STSP3	---	---	15-25	---	---	---
Sandberg bluegrass	POSE	---	---	---	---	---	2-5
basin wildrye	ELCI2	---	---	---	---	---	2-5
Other perennial grasses	PFGG	5-10	5-10	2-5	---	---	10-25
Perennial forbs	PPFF	5-15	5-10	5-10	---	---	2-5
Annual forbs	AAFF	2-5	1-3	2-5	---	---	2-5
Low sagebrush	ARAB	5-20	---	---	---	---	---
Antelope bitterbrush	PUTR2	2-5	---	---	---	---	---
Douglas rabbitbrush	CHV18	2-5	---	2-5	---	---	---
Low sagebrush	ARAB	---	10-20	---	---	---	---
Littleleaf horsebrush	TEGL	---	2-5	---	---	---	---
Wyoming big sagebrush	ARTRW	---	---	15-20	---	---	---
Green ephedra	EPV1	---	---	5-15	---	---	---
Spiny hopsage	GRSP	---	---	2-5	---	---	10-20
Big sagebrush	ARTR1	---	---	---	---	---	10-30
Rabbitbrush	CJRY59	---	---	---	---	---	10-30
Other shrubs	SSSS	1-5	5-10	2-5	---	---	5-15
Juniper	JUNIP	---	---	2-5	---	---	---
Range site symbol		026X023N	026X025N	026X022N	---	---	027X029N
Potential production (lb/acre):							
Favorable years		500	400	600	---	---	800
Normal years		400	300	450	---	---	500
Unfavorable years		300	200	300	---	---	100



TABLE 16.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions			
		Soil name		Inclusion number--	
		Seralegu.	Isolde	1	2
Needleandthread	STCO4	15-20	10-15	---	---
Indian ricegrass	ORRY	15-20	10-20	10-15	---
Needlegrass	STIPA	5-15	---	20-40	---
Bottlebrush squirowtail	SLHY	5-10	---	5-10	---
Other perennial grasses	PFGG	5-10	---	5-15	---
Perennial forbs	PFPF	5-10	2-5	5-15	---
Annual forbs	AAPF	2-5	2-5	2-5	---
Big sagebrush	ARTR2	5-10	---	---	---
Spiny hopsage	GRSP	2-5	---	2-5	---
Anderson peachbrush	PRAN2	2-4	---	2-5	---
Ephedra	EPHE2	2-5	---	2-8	---
Hairy horsebrush	TECO2	---	30-40	---	---
Fourwing saltbush	ATCA1	---	10-20	---	---
Nevada dalea	DAP02	---	5-10	---	---
Littleleaf horsebrush	TEG1	---	5-10	---	---
Wyoming big sagebrush	ARTR*	---	---	5-10	---
Douglas rabbitbrush	CHV18	---	---	2-5	---
Other shrubs	SSSS	2-15	5-10	2-5	---
Range site symbol		026X020N	027X023N	026X016N	---
Potential production (lb/acre):					
Favorable years		800	300	800	---
Normal years		600	200	600	---
Unfavorable years		400	100	400	---

TABLE 17.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions			
		Component name		Inclusion number--	
		Patna	Badland	1	2
Indian ricegrass	ORHY	30-50	---	10-20	---
Needleandthread	STCO4	2-10	---	10-20	---
Bluegrass	POA++	---	---	---	10-30
Bottlebrush squirreltail	SIHY	---	---	---	2-10
Other perennial grasses	PPGG	2-10	---	---	2-10
Perennial forbs	PPFF	2-5	---	2-5	5-10
Annual forbs	AAFF	2-5	---	2-5	---
Fourwing saltbush	ATCA2	5-15	---	10-20	---
Winterfat	ZULA5	2-10	---	---	---
Nevada dulse	DAPO2	2-10	---	5-10	---
Hairy horsebrush	TECO2	---	---	30-40	---
Littleleaf horsebrush	TEGL	---	---	5-10	---
Shadscale	ATCO	---	---	---	10-20
Gray greasewood	SAVER	---	---	---	5-10
Bud sagebrush	ARSP5	---	---	---	5-10
Other shrubs	SSSS	5-10	---	5-10	5-15
Range site symbol		027X009M	---	027X023N	027X030N
Potential production (lb/acre):					
Favorable years		800	---	300	400
Normal years		450	---	200	300
Unfavorable years		200	---	100	200

TABLE 18.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions						
		Soil name			Inclusion number--			
		Theon	Lepos	Clac		3	4	
Desert needlegrass	STSP3	20-30	---	---	2-10	---	---	---
Indian ricegrass	ORRY	5-10	---	5-10	5-20	---	10-20	30-50
Sandberg bluegrass	POSE	2-5	5-10	---	---	---	---	---
Bottlebrush squirreltail	SIHY	2-5	---	5-10	---	---	5-10	---
Pine bluegrass	POSC	---	10-20	---	---	---	---	---
Thurber needlegrass	STTH2	---	5-15	20-40	---	---	---	---
Bluegrass	POA++	---	---	5-15	---	---	---	---
Needleandthread	STCO4	---	---	---	---	---	---	---
Other perennial grasses	PPCG	2-5	5-10	5-10	2-5	---	2-5	2-5
Perennial forbs	PPFF	5-10	5-10	5-10	5-10	---	3-7	2-5
Annual forbs	AAFP	---	---	1-3	---	---	2-5	2-5
Littleleaf horsebrush	TECL	10-20	---	2-5	---	---	---	---
Shadscale	ATCO	5-15	---	---	0-20	---	15-30	---
Low sagebrush	ARAR8	---	25-35	0-10	---	---	---	---
Bailey greasewood	SAVEB	---	---	---	5-15	---	5-30	---
Bad sagebrush	APSP5	---	---	---	2-10	---	5-15	---
Nevada sagebrush	EPNE	---	---	---	2-5	---	---	---
Fourwing saltbush	ATCA2	---	---	---	---	---	---	5-15
White sagebrush	WULAS	---	---	---	---	---	---	2-10
Nevada dalea	DAPO2	---	---	---	---	---	---	2-10
Other shrubs	SSSS	5-15	5-10	5-10	5-10	---	5-10	5-10
Range site symbol		027X017N	027X02CA	26X015N	027X027N	---	027X018N	027X009N
Potential production, lb/acre								
Favorable years		400	400	400	200	---	500	800
Normal years		200	200	300	100	---	300	450
Unfavorable years		100	100	200	50	---	100	200

TABLE 19.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions					
		Component name			Inclusion number--		
		Theon	Back outcrop	Old Camp	1	2	3
Desert needlegrass	STSP3	20-30	---	15-25	2-10	---	---
Indian ricegrass	ORRY	5-10	---	---	5-20	5-10	---
Sandberg bluegrass	POSF	2-5	---	---	---	---	---
Bottlebrush squarrootall	SINY	2-5	---	5-10	---	5-10	---
Thurber needlegrass	STW2	---	---	2-5	---	20-40	---
Bluegrass	PCA++	---	---	---	---	5-15	---
Other perennial grasses	PPGG	2-5	---	2-5	2-5	5-10	---
Perennial forbs	PPFF	5-10	---	5-10	5-10	5-10	---
Annual forbs	AAFF	---	---	2-5	---	1-3	---
Littleleaf horsebrush	TEGL	10-20	---	---	---	2-5	---
Shadscale	ATCO	5-15	---	---	10-20	---	---
Wyoming big sagebrush	ARTR*	---	---	15-20	---	---	---
Green sphaedra	EPV1	---	---	5-15	---	---	---
Douglas rabbitbrush	CHV18	---	---	2-5	---	---	---
Spiny hopsage	GRSP	---	---	2-5	---	---	---
Bailey greasewood	SAVEB	---	---	---	5-15	---	---
Bud sagebrush	ARSP3	---	---	---	2-10	---	---
Nevada sphaedra	EPNE	---	---	---	2-5	---	---
Low sagebrush	ARARB	---	---	---	---	10-20	---
Other shrubs	SSSS	5-15	---	2-5	5-10	5-10	---
Juniper	JUNIP	---	---	2-5	---	---	---
Range site symbol		027X017N	---	026X012N	027X027N	026X025N	---
Potential production (lb/acre):							
Favorable years		400	---	600	200	400	---
Normal years		200	---	450	100	300	---
Unfavorable years		100	---	300	50	200	---

TABLE 20.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Ause of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions			
		Soil name		Inclusion number--	
		Theon	Singatee	1	2
Desert needlegrass	STSP3	20-30	2-10	---	---
Indian ricegrass	ORHY	5-10	5-20	---	10-20
Sandberg bluegrass	POSE	2-5	---	---	---
Bottlebrush squirreltail	SIHY	2-5	---	---	5-10
Other perennial grasses	PPGG	2-5	2-5	---	2-5
Perennial forbs	PPFP	5-10	5-10	---	3-7
Annual forbs	AAFP	---	---	---	2-5
Littleleaf horsebrush	TEGL	10-20	---	---	---
Shadscale	ATCO	5-15	10-20	---	15-30
Bailey greasewood	SAVEL	---	5-10	---	5-30
Bud sagebrush	AKSP5	---	2-10	---	5-15
Nevada opuntia	EPHE	---	2-5	---	---
Other shrubs	SSSS	5-15	5-10	---	5-10
Range site symbol		027X017N	027X027N	---	027X018N
Potential production (lb/acre):					
Favorable years		400	200	---	500
Normal years		200	100	---	300
Unfavorable years		100	50	---	100

TABLE 21.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name		Inclusion number---		
		Thorn	Old Camp	1	2	3
Desert needlegrass	STSP3	20-30	15-25	---	---	2-10
Indian ricegrass	ORRY	5-10	---	---	---	5-20
Sandberg bluegrass	POSE	2-5	---	---	2-5	---
Boerhaavia squarreltail	STTY	2-5	5-10	---	---	---
Thurber needlegrass	STTH2	---	2-5	---	---	---
Basin wildrye	ELCI2	---	---	---	2-5	---
Other perennial grasses	PPGG	2-5	2-5	---	10-25	2-5
Perennial forbs	PPFF	5-10	5-10	---	2-5	5-10
Annual forbs	AAFF	---	2-5	---	2-5	---
Littleleaf horsebrush	TEGL	10-20	---	---	---	---
Shadscale	ATCO	5-15	---	---	---	10-20
Wyoming big sagebrush	ARTRW	---	15-20	---	---	---
Green ephedra	EPVI	---	5-15	---	---	---
Douglas rabbitbrush	CHVI8	---	2-5	---	---	---
Spray hopsage	GRSP	---	2-5	---	10-20	---
Big sagebrush	ARTR2	---	---	---	10-30	---
Rabbitbrush	CHRY59	---	---	---	10-30	---
Bailey ginsengwood	SAVER	---	---	---	---	5-15
Manzanita	APSP5	---	---	---	---	2-10
Nevada ephedra	EPNE	---	---	---	---	2-5
Other shrubs	SSSS	5-15	2-5	---	5-15	5-10
Juniper	JUN1P	---	2-5	---	---	---
Range site symbol		027X017N	026X022N	---	027X029N	027X027N
Potential production (lb/acre):						
Favorable years		400	600	---	800	200
Normal years		200	450	---	500	100
Unfavorable years		100	300	---	100	50

TABLE 22.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species of the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name		Inclusion number--		
		Ister	Devada	1	2	3
Needlegrass	GTIP	25-40	---	---	25-40	---
Basin wildrye	ELC12	10-20	---	---	10-20	---
Bluegrass	POA++	5-10	10-20	---	5-10	---
Bottlebrush squirreltail	SIMY	2-5	5-10	5-10	2-5	---
Thurber needlegrass	STTR2	---	15-35	4-5	---	---
Desert needlegrass	STSP3	---	---	15-25	---	---
Other perennial grasses	PPGG	5-10	5-10	2-5	5-10	---
Perennial forbs	PPFF	5-15	5-15	5-10	5-15	---
Annual forbs	AAFT	1-3	2-5	2-5	1-3	---
Wyoming big sagebrush	ARTRH*	5-15	---	15-20	5-15	---
Antelope bitterbrush	PUR2	5-15	2-5	---	5-10	---
Low sagebrush	ABAB8	---	5-10	---	---	---
Douglas rabbitbrush	CHV18	---	2-5	2-5	---	---
Green sphaera	EFVI	---	---	5-15	---	---
Spiny hopsage	GRSP	---	---	2-5	---	---
Other shrubs	SSSS	5-10	1-5	4-5	5-10	---
Juniper	JUNIP	---	---	2-5	---	---
Other trees	TTTT	T-2	---	---	T-2	---
Range site symbol		026X010N	026X023N	026X022N	026X010N	---
Potential production (lb/acre):						
Favorable years		900	500	600	900	---
Normal years		700	400	450	700	---
Unfavorable years		600	300	300	600	---

TABLE 23.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions				
		Component name			Inclusion number--	
		Ister	Old Camp	Rock outcrop	1	2
Needlegrass	STPA	25-40	---	---	---	---
Basin wildrye	ELC12	10-20	---	---	---	---
Bluegrass	POA++	5-10	---	---	---	5-15
Bottlebrush squirreltail	SIHV	2-5	5-10	---	---	5-10
Desert needlegrass	STSP3	---	15-25	---	---	---
Thurber needlegrass	STTH2	---	2-5	---	---	20-40
Indian r.egrass	ORNY	---	---	---	---	5-10
Other perennial grasses	PPGG	5-10	2-5	---	---	5-10
Perennial forbs	PPFP	5-15	5-10	---	---	5-10
Annual forbs	AAFY	1-3	2-5	---	---	1-3
Wyoming big sagebrush	APCHW*	5-10	15-20	---	---	---
Antelope bitterbrush	FLBR*	5-10	---	---	---	---
Green sphedra	EPV1	---	5-15	---	---	---
Douglas rabbitbrush	CHV16	---	2-5	---	---	---
Spiny hopsage	CHSP	---	2-5	---	---	---
Low sagebrush	ARGAB*	---	---	---	---	15-20
Little leaf horsebrush	TEHL	---	---	---	---	2-5
Other shrubs	SSSS	5-10	2-5	---	---	5-10
Juniper	JUN1P	---	2-5	---	---	---
Wood trees	TTT	1-2	---	---	---	---
Range site symbol		026X010N	026X022N	---	---	026X025N
Potential production (lb/acre):						
Favorable years		900	600	---	---	400
Normal years		700	450	---	---	300
Unfavorable years		600	300	---	---	200



TABLE 24.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name	Inclusion number--	
		Sagoupe	1	2
Tufted hairgrass	DECA5	20-40	20-40	20-40
Sedge	CAPEX	15-30	15-30	15-30
Rush	JUNCO	10-20	10-20	10-20
Nevada bluegrass	POHE3	10-15	10-15	10-15
Meadow larkspur	POHE3	5-10	5-10	5-10
Other perennial grasses	PPGG	2-5	2-5	2-5
Perennial forbs	PPFF	5-10	5-10	5-10
Shrubs	SSSS	3-7	3-7	3-7
Trees	TTTT	2-3	2-3	2-3
Range site symbol		027X004N	027X004N	027X004N
Potential production (lb/acre):				
Favorable years		1,500	1,500	1,500
Normal years		1,500	1,500	1,500
Unfavorable years		1,000	1,000	1,000

TABLE 25.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name	Inclusion number--	
		Sagouape	1	2
Creeping wildrye	ELTR3	30-60	30-60	30-60
Basin wildrye	ELC12	10-20	10-20	10-20
Western wheatgrass	AWSM	10-20	10-20	10-20
Slender wheatgrass	ACTP	5-10	5-10	5-10
Inland saltgrass	DIST	2-5	2-5	2-5
Other perennial grasses	PPGG	2-5	2-5	2-5
Perennial forbs	PPFP	5-10	5-10	5-10
Basin big sagebrush	ARTRT*	15-20	15-20	15-20
Rubber rabbitbrush	CHNA2	5-10	5-10	5-10
Trees	TTTT	2-5	2-5	2-5
Range site symbol		027X002N	027X002N	027X002N
Potential production (lb/acre):				
Favorable years		3,000	3,000	3,000
Normal years		2,500	2,500	2,500
Unfavorable years		2,000	2,000	2,000

TABLE 26.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. Absence of an entry indicates that the named plant is not a key species in the potential native plant community.

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name		Inclusion number--		
		Chalco	Haar	1	2	3
Thurber needlegrass	STTH2	15-35	---	---	---	---
Bluegrass	POA++	10-20	---	---	---	X
Bottlebrush squirreltail	SIMY	5-10	5-10	---	---	X
Needlegrass	STIPA	---	10-15	---	---	---
Indian ricegrass	ORHY	---	5-10	---	---	---
Basin wildrye	ELCI2	---	---	35-40	---	---
Nevada bluegrass	PONE3	---	---	5-10	---	---
Sedge	CAREX	---	---	2-5	---	X
Other perennial grasses	PPGG	5-10	2-5	5-15	---	X
Perennial forbs	PPFP	5-15	5-10	5-15	---	X
Annual forbs	AAFF	2-5	1-5	2-5	---	X
Low sagebrush	APAR8	5-20	---	---	---	---
Antelope bitterbrush	PATR2	2-5	5-10	---	---	X
Douglas rabbitbrush	CHV78	2-5	5-10	---	---	---
Wyoming big sagebrush	ARTRW*	---	15-20	---	---	---
Purple sage	SA. A9	---	5-10	---	---	---
Big sagebrush	ARTR2	---	---	10-15	---	---
Eriogonum	ERIOG	---	---	---	---	X
Serviceberry	AMELA	---	---	---	---	X
Phlox	PHLOX	---	---	---	---	X
Anderson peachbrush	PPAM2	---	---	---	---	X
Other shrubs	SSSS	1-5	2-5	5-10	---	X
Ponderosa pine	PIPO	---	---	---	---	X
Jeffrey pine	PLJE	---	---	---	---	X
Other trees	TTTT	---	2-5	---	---	---
Range site symbol		026X023N	026X029N	026X030N	---	---
Woodland site symbol		---	---	---	---	026X065N
Potential production (lb/acre):						
Favorable years		500	200	1,500	---	75
Normal years		400	150	1,000	---	50
Unfavorable years		300	100	1,500	---	25

TABLE 27.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

(Absence of an entry indicates that the named plant is not a key species in the potential native plant community.)

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions					
		Soil name			Inclusion number--		
		Lapon	Fulstote	Olac	1	2	3
Fine bluegrass	POSC	10-15	---	---	---	---	---
Thinner needlegrass	HTT	5-15	20-40	10-40	2-5	---	---
Sandberg bluegrass	POSE	5-10	---	---	---	---	---
Bluegrass	POA++	---	5-15	5-15	---	3-8	---
Indigo bluegrass	GRNY	---	5-10	5-10	---	---	---
Portulacanthus squarrolata	SRY	---	5-10	5-10	5-10	2-5	---
Desert needlegrass	STSP	---	---	---	15-25	---	---
Basin wildrye	BLA	---	---	---	---	25-35	---
Western wheatgrass	POW	---	---	---	---	5-10	---
Other perennial grasses	PGC	5-10	5-10	5-10	2-5	5-10	---
Perennial forbs	PPFF	5-10	5-10	5-10	5-10	5-10	---
Annual forbs	AAFF	---	2-3	2-3	2-5	2-5	---
Low sagebrush	ARAR	25-35	10-20	10-20	---	---	---
Little bluestem	TLB	---	2-5	2-5	---	---	---
Wyoming big sagebrush	ARTW*	---	---	---	15-20	---	---
Green squirrel	EPV1	---	---	---	5-15	---	---
Douglas rabbitbrush	CHV18	---	---	---	2-5	---	---
Sage hopdog	CRSP	---	---	---	2-5	---	---
Basin big sagebrush	ARTT*	---	---	---	---	10-20	---
Antelope sagebrush	HTT2	---	---	---	---	5-10	---
Other shrubs	SSSS	5-10	5-10	5-10	2-5	5-10	---
Juniper	JUNIP	---	---	---	2-5	---	---
Range soil symbol		027X020N	026X025N	026X025N	026X022N	026X034N	---
Potential production lb./acre							
Favorable years		400	400	400	600	1,000	---
Normal years		200	300	300	450	800	---
Unfavorable years		100	200	200	300	600	---

TABLE 28. RANGELAND PLANTS AND WOODLAND UNDERSTORY

The letter T means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions			
		Soil name	Inclusion number--		
		Chill	1	2	3
Desert needlegrass	STSP3	30-50	30-50	---	2-5
Thurber needlegrass	STTH2	5-15	5-5	---	---
Indian ricegrass	CRMY	2-5	2-5	10-15	5-15
Bottlebrush squarreltail	SIHY	2-5	2-5	5-10	---
Sandberg bluegrass	PGSE	1-5	1-5	---	---
Needlegrass	STIPA	---	---	20-40	---
Other perennial grasses	PPGG	1-5	1-5	5-15	---
Perennial forbs	PPFF	5-15	5-15	5-15	1-3
Annual forbs	AAFF	1-3	1-3	2-5	1-2
Wyoming big sagebrush	AKTW*	5-10	5-10	5-10	10-40
Ephedra	EPHE2	5-10	5-10	2-8	---
Purple sage	SACA9	5-10	5-10	---	---
Douglas rabbitbrush	CRLE	2-5	2-5	2-5	---
Horsebrush	TETRA3	2-5	2-5	---	---
Anderson peachbrush	FRAN2	---	---	2-5	---
Spry hopsage	GRSP	---	---	2-5	15-30
Other shrubs	SSSS	2-5	2-5	2-5	2-5
Trees	TTTT	2-2	2-2	---	---
Range site symbol		02CX011N	026X011N	026X016N	026X024N
Potential production (lb/acre):					
Favorable years		800	800	800	400
Normal years		600	600	600	300
Unfavorable years		400	400	400	200

TABLE 29.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions	
		Soil name	Inclusion number--
		Perazzo	I
Indian ricegrass	ORNY	10-20	5-15
Bottlebrush squirreltail	SIHY	5-10	---
Desert needlegrass	STSP3	---	2-5
Other perennial grasses	PPCG	2-5	---
Perennial forbs	PPFF	3-7	1-3
Annual forbs	AAFF	2-5	1-2
Shadscale	ATCO	15-30	---
Bailey grasswood	SAVIB	5-30	---
Bud sagebrush	ARSP5	5-15	---
Wyoming big sagebrush	ARSP3	---	20-40
Spiny hopsage	GRSP	---	15-30
Other shrubs	SSSH	5-10	2-5
Range site symbol		027X018N	026X024N
Potential production (lb/acre):			
Favorable years		500	400
Normal years		300	300
Unfavorable years		100	200

TABLE 30. -RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions	
		Soil name	Inclusion number--
		Perazzo	1
Indian ricegrass	QRHY	10-20	5-15
Bottlebrush squirreltail	SIHY	5-10	---
Desert needlegrass	STSP3	---	2-5
Other perennial grasses	PPGG	2-5	---
Perennial forbs	PPFF	3--	1-3
Annual forbs	AAFF	2-5	1-2
Shadscale	ATCO	15-30	---
Bailey greasewood	BAVEB	5-30	---
Bud sagebrush	ARSP5	5-15	---
Wyoming big sagebrush	ARTW*	---	20-40
Spiny hopsage	GRSP	---	15-30
Other shrubs	SSSS	5-10	2-5
Range site symbol		027X018N	026X024N
Potential production (lb/acre):			
Favorable years		500	400
Normal years		300	300
Unfavorable years		100	200

TABLE 31.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions			
		Soil name	Inclusion number--		
		Springmeyer Variant	1	2	3
Basin wildrye	ELC12	35-60	---	30-50	15-20
Nevada bluegrass	PONE3	5-10	---	---	5-10
Sedge	CAREX	2-5	---	---	---
Thurber needlegrass	STIM2	---	20-40	---	---
Bluegrass	POA++	---	5-15	---	---
Indian ricegrass	ORNY	---	5-10	---	---
Bottlebrush squirttail	SIHY	---	5-10	---	---
Inland saltgrass	DIST	---	---	5-15	---
Alkali sacaton	SPAI	---	---	5-10	---
Creeping wildrye	ELTR3	---	---	5-10	40-60
Other perennial grasses	POG	5-15	5-10	5-10	2-5
Perennial forbs	PPFF	5-15	5-10	5-10	5-15
Annual forbs	AAFF	2-5	1-3	2-5	---
Big sagebrush	ARTR2	10-15	---	---	---
Low sagebrush	ARAR8	---	10-20	---	---
Littleleaf horsebrush	TEGL	---	2-5	---	---
Black greasewood	SAVE4	---	---	5-10	---
Rubber rabbitbrush	CNA2	---	---	2-5	---
Basin big sagebrush	ARTR1*	---	---	2-5	---
Other shrubs	SSSS	5-10	5-10	1-2	5-15
Willow	SALIX	---	---	---	2-5
Cottonwood	POPUL	---	---	---	2-5
Range site symbol		026X030N	026X025N	026X004N	026X001N
Potential production (lb/acre):					
Favorable years		2,500	400	2,000	1,000
Normal years		2,000	300	1,500	2,500
Unfavorable years		1,500	200	1,000	2,000



TABLE 32.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions					
		Component name			Inclusion number--		
		Risley	Rubble land	Devada	1	2	3
Desert needlegrass	STSP3	15-25	---	---	---	---	30-50
Bottlebrush squ. reeltail	SIHY	5-10	---	5-10	---	---	2-5
Thurber needlegrass	STTH2	2-5	---	15-35	---	15-20	5-15
Bluegrass	POA++	---	---	10-20	---	---	---
Indian ricegrass	ORHY	---	---	---	---	5-10	2-5
Basin wildrye	ELCI2	---	---	---	---	2-5	---
Sandberg bluegrass	POSE	---	---	---	---	---	2-5
Other perennial grasses	P20C	2-5	---	5-10	---	5-12	1-5
Perennial forbs	PF77	5-10	---	5-15	---	1-5	5-15
Annual forbs	AA77	2-5	---	2-5	---	2-5	1-3
Wyoming big sagebrush	AKRW*	15-20	---	---	---	10-20	5-10
Green sphedra	EPVI	5-15	---	---	---	---	---
Douglas rabbitbrush	CHV18	2-5	---	2-5	---	2-5	2-5
Spiny hopsage	GRSP	2-5	---	---	---	---	---
Low sagebrush	ARAR8	---	---	5-20	---	---	---
Antelope bitterbrush	PUTR2	---	---	2-5	---	5-10	---
Ephedra	EPHE2	---	---	---	---	---	5-10
Purple sage	SACA9	---	---	---	---	---	5-10
Horsebrush	TETRA3	---	---	---	---	---	2-5
Other shrubs	SSSS	2-5	---	1-5	---	2-5	2-5
Juniper	JUNIP	2-5	---	---	---	---	---
Utah juniper	JUGS	---	---	---	---	5-10	---
Other trees	TITT	---	---	---	---	---	T-2
Range site symbol		026X022N	---	026X023N	---	026X017N	026X011N
Potential production (lb/acre):							
Favorable years		600	---	500	---	700	800
Normal years		450	---	400	---	600	600
Unfavorable years		300	---	300	---	500	400

TABLE 33.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions						
		Soil name			Inclusion number--			
		Risley	Xman	Rock outcrop	1	2	3	4
Thurber needlegrass	STNH2	15-20	10-40	---	2-5	---	2-5	---
Indian ricegrass	ORRY	5-10	5-10	---	---	5-10	---	---
Bass wildrye	ELCI2	2-5	---	---	---	---	---	10-20
Bluegrass	POA++	---	5-15	---	---	---	---	5-10
Bottlebrush squill	SIHY	---	5-10	---	5-10	5-10	5-10	2-5
Desert needlegrass	STSP3	---	---	---	15-25	---	15-25	---
Needlegrass	STIPA	---	---	---	---	10-15	---	25-40
Other perennial grasses	PPGG	5-12	5-10	---	2-5	2-5	2-5	5-10
Perennial forbs	PPFT	1-5	5-10	---	5-10	5-10	5-10	5-15
Annual forbs	AAFF	1-5	1-3	---	2-5	1-5	2-5	1-3
Wyoming big sagebrush	ARTPW*	10-20	---	---	15-20	15-20	15-20	5-15
Antelope bitterbrush	PATR2	5-10	---	---	---	5-10	---	5-1
Douglas rabbitbrush	CHV18	2-5	---	---	2-5	5-10	2-5	---
Low sagebrush	ARAR8	---	10-10	---	---	---	---	---
Littleleaf horsebrush	THGL	---	2-5	---	---	---	---	---
Green ophedra	EPV1	---	---	---	5-15	---	5-15	---
Spiny hopsage	GRSP	---	---	---	2-5	---	2-5	---
Purple sage	SACA9	---	---	---	---	5-10	---	---
Other shrubs	SSSS	2-5	5-10	---	2-5	2-5	2-5	5-10
Utah juniper	JUOS	5-10	---	---	---	---	---	---
Juniper	JUNIP	---	---	---	2-5	---	2-5	---
Other trees	TITT	---	---	---	---	2-5	---	T-2
Range site symbol		026X017N	026X025N	---	026X022N	026X029N	026X022N	026X010N
Potential production (lb/acre):								
Favorable years		700	400	---	600	200	600	900
Normal years		600	300	---	450	150	450	700
Unfavorable years		500	200	---	300	100	300	600

TABLE 34.--PANCELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name	Inclusion number--	
		Honevill	1	2
Needlegrass	ST1PA	20-40	---	20-40
Indian ricegrass	ORNY	10-15	5-15	10-15
Bottlebrush squirreltail	S1NY	5-10	---	5-10
Desert needlegrass	STSP3	---	2-4	---
Other perennial grasses	PPGG	5-15	---	5-15
Perennial forbs	PPFF	5-15	1-3	5-15
Annual forbs	AAFF	2-5	1-2	2-5
Wyoming big sagebrush	ARTFW*	5-10	20-40	5-10
Ephedra	EPHED	2-8	---	2-8
Anderson peachbrush	FRAN2	2-5	---	2-5
Douglas rabbitbrush	CHV10	2-5	---	2-5
Spruce lodgepole	CKSP	2-5	15-30	2-5
Other shrubs	SSSS	2-5	2-5	2-5
Range site symbol		026X016N	026X024N	026X016N
Potential production (lb/acre):				
Favorable years		800	400	800
Normal years		600	300	600
Unfavorable years		400	200	400

TABLE 35.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name	Inclusion number--	
		Humewill	1	2
Needlegrass	STPA	20-40	20-40	---
Indian ricegrass	ORRY	10-15	10-15	5-15
Bottlebrush squirreltail	SIHY	5-10	5-10	---
Desert needlegrass	STSP3	---	---	4-5
Other perennial grasses	FPGG	5-15	5-15	---
Perennial forbs	PPFY	5-15	5-15	1-3
Annual forbs	AAFF	2-5	2-5	1-2
Wyoming big sagebrush	ARTRW*	5-10	5-10	20-40
Ephedra	EPHE	2-8	2-8	---
Anderson peachbrush	PRAN2	2-5	2-5	---
Douglas rabbitbrush	CHV18	2-5	2-	---
Spry hopsage	GRSP	2-5	2-5	15-30
Other shrubs	SSSS	2-5	2-5	2-5
Range site symbol		026X016N	026X016N	026X024N
Potential production (lb/acre):				
Favorable years		800	800	400
Normal years		600	600	300
Unfavorable years		400	400	200

TABLE 36.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name	Inclusion number--	
		Vets	1	2
Indian ricegrass	ORRY	5-15	10-15	10-15
Desert needlegrass	STSP9	2-5	---	---
Needlegrass	STSPA	---	20-40	20-40
Bottlebrush squirreltail	SIHV	---	5-10	5-10
Other perennial grasses	PGGG	---	5-15	5-15
Perennial forbs	PFPF	1-3	5-15	5-15
Annual forbs	AAPF	1-2	2-5	2-5
Wyoming big sagebrush	ARTW*	20-40	5-10	5-10
Spiny hopsgage	SPSP	15-30	2-5	2-5
Ephedra	EFED	---	2-8	2-8
Anderson pea shrub	PRAN.	---	2-5	2-5
Douglas rabbitbrush	CHV18	---	2-5	2-5
Other shrubs	SSSS	2-5	2-5	2-5
Range site symbol		026X024N	026X016N	026X016N
Potential production (lb/acre):				
Favorable years		400	800	800
Normal years		300	600	600
Unfavorable years		200	400	400

TABLE 37.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter 'T' means trees. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production, dry weight, of plants on each component and inclusion					
		Component name			Inclusion number--		
		Olac	Bombad 1	Rock outcrop	1	2	3
Thurber needlegrass	STTR2	20-40	---	---	20-40	20-35	---
Bluegrass	POA++	5-15	---	---	5-15	---	---
Indian ricegrass	ORHY	5-10	5-15	---	5-10	5-10	10-15
Bottlebrush squirreltail	SIHY	5-10	5-10	---	5-10	10-15	5-10
Pine bluegrass	POSC	---	5-15	---	---	---	---
Needlegrass	STTR4	---	5-10	---	---	---	2-40
Basin wildrye	ELC12	---	---	---	---	5-12	---
Other perennial grasses	PKK	5-10	5-10	---	5-10	5-10	5-15
Perennial forbs	PPFF	5-10	5-10	---	5-10	5-12	5-15
Annual forbs	AAFF	1-3	---	---	1-3	2-5	2-5
Low sagebrush	ARAB8	10-20	---	---	10-20	---	---
Littleleaf horsebrush	TEGL	2-5	---	---	2-5	---	---
Wyoming big sagebrush	ARTR*	---	10-20	---	---	10-15	5-10
Spiny hopsage	GRSP	---	10-20	---	---	---	2-5
Nevada opuntia	FIN7	---	5-10	---	---	---	---
Antelope bitterbrush	PTR2	---	---	---	---	5-10	---
Douglas rabbitbrush	CHV18	---	---	---	---	2-5	2-5
Green opuntia	EP11	---	---	---	---	2-5	---
Ephedra	EPHE8	---	---	---	---	---	2-8
Anderson peachbrush	PRAN2	---	---	---	---	---	2-5
Other shrubs	SSSS	5-10	5-15	---	5-10	2-10	2-5
Trees	TTTT	---	---	---	---	T-2	---
Range site symbol		026X025N	027X008N	---	026X025N	026X015N	026X016N
Potential production (lb/acre):							
Favorable years		400	700	---	400	700	800
Normal years		300	500	---	300	600	600
Unfavorable years		200	300	---	200	450	400

TABLE 38.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions						
		Component name			Inclusion number--			
		Olac	Old Camp	Rock outcrop	1	2	3	4
Thunder needlegrass	STTH2	20-40	2-5	---	---	---	20-40	---
Bluegrass	POA++	4-15	---	---	---	+	5-5	---
Indian ricegrass	ORHY	5-10	---	---	---	X	5-10	5-15
Bottlebrush squirreltail	SIHY	5-10	5-10	---	---	X	5-10	---
Desert needlegrass	STSP3	---	15-25	---	---	---	---	2-5
Neotoma grass	STLPA	---	---	---	---	X	---	---
Fine bluegrass	POSC	---	---	---	---	X	---	---
Other perennial grasses	PPGG	5-10	2-5	---	---	X	5-10	---
Perennial forbs	PFFP	5-10	5-10	---	---	X	5-10	1-3
Annual forbs	AJFF	1-3	2-5	---	---	X	1-3	1-2
Low sagebrush	ARAB	---	---	---	---	---	10-20	---
Littleleaf horsebrush	TECI	---	---	---	---	---	2-5	---
Wyoming big sagebrush	ARTW+	---	5-10	---	---	---	---	20-40
Green ophebra	EPVI	---	5-5	---	---	X	---	---
Douglas rabbitbrush	CHV18	---	2-5	---	---	---	---	---
Spiny hopsage	GRSP	-	2-5	---	---	---	---	15-30
Mountain big sagebrush	ARTK+	---	-	---	---	X	---	---
Antelope bitterbrush	PUTP?	---	---	---	---	X	---	---
Other shrubs	SSSS	4-10	2-5	---	---	X	5-10	2-5
Juniper	JUNIP	---	2-5	---	---	---	---	---
Singleleaf pinyon	PINO	---	---	---	---	X	---	---
Utah juniper	JUCS	---	---	---	---	X	---	---
Range site symbol		026X025N	026X022N	---	---	---	026X025N	026X024N
Woodland site symbol		---	---	---	---	026X060N	---	---
Potential production (lb/acre):								
Favorable years		400	400	---	---	300	400	400
Normal years		300	450	---	---	225	300	300
Unfavorable years		20	50	---	---	150	200	200

TABLE 39.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions					
		Soil name			Inclusion number--		
		Glac	Old Camp	Ister	1	2	3
Thurber needlegrass	STTH2	20-40	2-5	---	---	---	---
Bluegrass	PGA++	5-15	---	5-10	---	---	---
Indian ricegrass	ORRY	5-10	---	---	---	---	---
Bottlebrush squirreltail	S. Y	5-10	5-10	2-5	---	---	---
Desert needlegrass	STSP3	---	15-25	---	---	---	---
Needlegrass	STIPA	---	---	25-40	---	---	---
Basin wildrye	ELC12	---	---	10-20	---	---	---
Idaho fescue	FE10	---	---	---	20-30	---	---
Bluebunch wheatgrass	AGSP	---	---	---	5-10	---	---
Mountain brome	BRMA4	---	---	---	2-5	---	---
Other perennial grasses	PFGG	5-10	2-5	5-10	1-3	---	---
Phlox	PHLOX	---	---	---	2-5	---	---
Other perennial forbs	PFTT	5-10	5-10	5-15	1-5	---	---
Annual forbs	AAFT	1-3	2-5	1-3	1-3	---	---
Low sagebrush	ASAR8	10-20	---	---	---	---	---
Littleleaf horsebrush	TEGL	2-5	---	---	---	---	---
Wyoming big sagebrush	ARTRW*	---	15-20	5-15	---	---	---
Green ephedra	EPv1	---	5-15	---	---	---	---
Douglas rabbitbrush	CHV18	---	2-5	---	---	---	---
Spiny hysage	GPSP	---	2-5	---	---	---	---
Antelope bitterbrush	PUTR1	---	---	5-10	5-10	---	---
Mountain big sagebrush	APRV	---	---	---	10-12	---	---
Snowberry	SIMPH	---	---	---	1-5	---	---
Serviceberry	AMELA	---	---	---	1-3	---	---
Lanceleaf rabbitbrush	CHV1L	---	---	---	1-2	---	---
Other shrubs	SSSS	5-10	2-5	5-10	1-3	---	---
Juniper	JUNIP	---	2-5	---	---	---	---
Other trees	TTTT	---	---	T-2	---	---	---
Range site symbol		026X025N	026X022N	026X010W	026X007N	---	---
Potential production (lb/acre):							
Favorable years		400	600	900	1,000	---	---
Normal years		300	450	700	800	---	---
Unfavorable years		200	300	600	600	---	---



TABLE 40.—RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions						
		Soil name			Inclusion number--			
		Olac	Chalco	Naar	1	2	3	4
Thunder needlegress	STTH2	20-40	20-40	---	2-5	20-40	---	---
Bluegrass	FOA++	5-15	5-15	---	---	5-15	---	---
Indian ricegrass	OWRY	5-10	5-10	5-10	---	5-10	---	---
Bottlebrush squirreltail	SIMY	5-10	5-10	5-10	5-10	5-10	---	---
Needlegress	SLPA	---	---	10-15	---	---	---	---
Desert needlegress	STSP3	---	---	---	15-25	---	---	---
Other perennial grasses	PKG	5-10	5-10	2-5	2-5	5-10	---	---
Perennial forbs	PPFP	5-10	5-10	5-10	5-10	5-10	---	---
Annual forbs	AATF	1-3	1-3	1-5	2-5	2-3	---	---
Low sagebrush	ARAR8	10-15	10-20	---	---	10-20	---	---
Littleleaf horsebrush	TFGL	2-5	2-5	---	---	2-5	---	---
Wyoming big sagebrush	ARTW*	---	---	15-20	15-20	---	---	---
Douglas rabbitbrush	CHV18	---	---	5-10	2-5	---	---	---
Purple sage	SACA9	---	---	5-10	---	---	---	---
Antelope bitterbrush	PJTB2	---	---	5-10	---	---	---	---
Green ephedra	EFv1	---	---	---	5-15	---	---	---
Spiny hopsage	GRSP	---	---	---	2-5	---	---	---
Other shrubs	SSSS	5-10	5-10	2-5	2-5	5-10	---	---
Juniper	JUNIP	---	---	---	2-5	---	---	---
Other trees	TITT	---	---	2-5	---	---	---	---
Range site symbol		026X025N	026X025N	026X029N	026X023h	026X025N	---	---
Potential production (lb/acre):								
Favorable years		400	400	200	600	400	---	---
Normal years		300	300	150	450	300	---	---
Unfavorable years		200	200	100	300	200	---	---

TABLE 41.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

(An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. Absence of an entry indicates that the named plant is not a key species in the potential native plant community.)

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions						
		Soil name			Inclusion number--			
		Olac	Cagle	Oppie	1	2	3	4
Thunder needlegrass	STTH	10-20	---	20-40	2-5	---	---	---
Bluegrass	POA++	5-15	---	5-15	---	---	---	---
Indian ricegrass	ORHY	5-10	X	5-10	---	X	---	---
Bottlebrush squirreltail	SIHY	5-10	X	5-10	5-10	X	---	---
Needlegrass	STIPA	---	X	---	---	X	---	---
Fine bluegrass	POSC	---	X	---	---	X	---	---
Desert needlegrass	STSP3	---	---	---	5-15	---	---	---
Other perennial grasses	PPGC	5-10	X	5-10	2-5	X	---	---
Perennial forbs	PPFF	5-10	X	5-10	5-10	X	---	---
Annual forbs	AAFF	1-3	X	1-3	2-5	X	---	---
Low sagebrush	ARAB	10-20	---	10-20	---	---	---	---
Little salt horsebrush	TEGL	1-5	---	2-5	---	---	---	---
Mountain big sagebrush	AKTRV	---	X	---	---	X	---	---
Antelope bitterbrush	FUTR2	---	X	---	---	X	---	---
Green ephedra	EPVI	---	X	---	5-10	X	---	---
Wyoming big sagebrush	AKTRW*	---	---	---	15-20	---	---	---
Douglas rabbitbrush	CHVIB	---	---	---	2-5	---	---	---
Spiny hopsage	CRSP	---	---	---	2-5	---	---	---
Other shrubs	SSSS	5-10	X	5-10	2-5	X	---	---
Singleleaf pinyon	PINO	---	X	---	---	X	---	---
Utah juniper	JUOS	---	X	---	---	X	---	---
Juniper	JUNIP	---	---	---	2-5	---	---	---
Range site symbol		026X025N	---	026X025N	026X022N	---	---	---
Woodland site symbol		---	026X060N	---	---	026X060N	---	---
Potential production (lb/acre):								
Favorable years		400	300	400	500	300	---	---
Normal years		300	225	300	450	225	---	---
Unfavorable years		200	150	200	300	150	---	---

TABLE 42.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions					
		Component name			Inclusion number--		
		Olac	Rubble land	Indiano	1	2	3
Thunder needlegrass	STNR2	10-40	---	10-20	2-5	15-20	---
Bluegrass	POA++	5-15	---	10-30	---	---	---
Indian ricegrass	ORRY	5-10	---	---	---	5-10	---
Bottlebrush squawtail	SIMY	5-10	---	---	5-10	---	---
Desert needlegrass	STSP3	---	---	---	15-25	---	---
Basin wildrye	ELC12	---	---	---	---	2-5	---
Other perennial grasses	FPCG	5-10	---	2-10	2-5	5-10	---
Perennial forbs	PPFF	5-10	---	5-10	5-10	1-5	---
Annual forbs	AAFF	1-3	---	---	2-5	2-5	---
Low sagebrush	APAR8	10-20	---	---	---	---	---
Littleleaf horsebrush	TEGL	2-5	---	---	---	---	---
Black sagebrush	ARTR2	---	---	5-25	---	---	---
Wyoming big sagebrush	ARTR6*	---	---	---	15-20	10-20	---
Creosotebush	EPVI	---	---	---	5-15	---	---
Douglas rabbitbrush	CHV16	---	---	---	2-5	2-5	---
Spiny hopsage	GRSP	---	---	---	2-5	---	---
Antelope bitterbrush	PUTR2	---	---	---	---	5-10	---
Other shrubs	SSSS	5-10	---	5-15	2-5	2-5	---
Juniper	JUNIP	---	---	---	2-5	---	---
Utah juniper	JUOS	---	---	---	---	5-10	---
Range site symbol		026X025N	---	027X054N	026X022N	026X017N	---
Potential production (lb/acre):							
Favorable years		400	---	1,000	600	700	---
Normal years		300	---	800	450	600	---
Unfavorable years		200	---	600	300	500	---

TABLE 43.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions					
		Soil name			Inclusion number--		
		Olac	Shallcone	Old Camp	1	2	3
Thurber needlegrass	STTH2	20-40	---	2-5	---	---	15-35
Bluegrass	POA++	5-15	X	---	---	---	10-20
Indian ricegrass	GRHY	5-10	---	---	---	X	---
Bottlebrush squirreltail	SIHY	5-10	X	5-10	---	X	5-10
Sedge	CAKEX	---	X	---	---	---	---
Desert needlegrass	STSP3	---	---	15-25	---	---	---
Needlegrass	STIPA	---	---	---	---	X	---
Pine bluegrass	POSC	---	---	---	---	X	---
Other perennial grasses	PPGG	5-10	X	2-5	---	X	5-10
Perennial forbs	PPFF	5-10	X	5-10	---	X	5-15
Annual forbs	AAFF	1-3	X	2-5	---	X	2-5
Low sagebrush	ARAR8	10-20	---	---	---	---	---
Littleleaf horsebrush	TEGL	2-5	---	---	---	---	---
Eriogonum	ERIOG	---	X	---	---	---	---
Serviceberry	AMELA	---	X	---	---	---	---
Phlox	PHLOX	---	X	---	---	---	---
Antelope bitterbrush	PUTR2	---	X	---	---	X	2-5
Anderson peachbrush	PRAN2	---	X	---	---	---	---
Wyoming big sagebrush	AFTRW*	---	---	15-20	---	---	---
Green epithema	EPV1	---	---	5-15	---	X	---
Douglas rabbitbrush	CHVIB	---	---	2-5	---	---	2-5
Spiny hopsage	GRSP	---	---	2-5	---	---	---
Mountain big sagebrush	ARTRV	---	---	---	---	X	---
Low sagebrush	ARAR8	---	---	---	---	---	5-20
Other shrubs	SSSS	5-10	X	2-5	---	X	2-5
Ponderosa pine	PIPO	---	X	---	---	---	---
Jeffrey pine	PIJE	---	X	---	---	---	---
Juniper	JUNIP	---	---	2-5	---	---	---
Singleleaf pinyon	PIMO	---	---	---	---	X	---
Utah juniper	JUOS	---	---	---	---	X	---
Range site symbol		026X026N	---	026X022N	---	---	026X023N
Woodland site symbol		---	026X065N	---	---	026X060N	---
Potential production (lb/acre):							
Favorable years		400	75	600	---	300	500
Normal years		300	50	450	---	225	400
Unfavorable years		200	25	300	---	150	300

TABLE 44.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions					
		Soil name			Inclusion number--		
		Loomer	Zephan	Olar	1	2	3
Thunder needlegrass	STTH2	20-40	20-40	20-40	---	15-20	---
Bluegrass	FOA++	5-15	5-15	5-15	---	---	---
Indian ricegrass	ORUY	5-10	5-10	5-10	10-15	5-10	5-15
Bottlebrush squirreltail	SIHY	5-10	5-10	5-10	5-10	---	---
Needlegrass	SIIPA	---	---	---	20-40	---	---
Basin wildrye	ZLC12	---	---	---	---	2-5	---
Desert needlegrass	STSP3	---	---	---	---	---	2-5
Other perennial grasses	PFGG	5-10	5-10	5-10	5-15	5-12	---
Perennial forbs	PFPF	5-10	5-10	5-10	5-15	1-5	1-3
Annual forbs	AAFF	1-3	1-3	1-3	2-5	2-5	1-2
Low sagebrush	ARAB8	10-20	10-20	10-20	---	---	---
Littleleaf horebrush	TEGL	2-5	2-5	2-5	---	---	---
Wyoming big sagebrush	AKTRW*	---	---	---	5-10	10-20	20-40
Ephedra	EPHE2	---	---	---	2-8	---	---
Anderson peachbrush	PRAN2	---	---	---	2-5	---	---
Douglas rabbitbrush	CHV18	---	---	---	2-5	2-5	---
Spiny hopsage	GRSP	---	---	---	3-5	---	15-30
Antelope bitterbrush	PUTR2	---	---	---	---	5-10	---
Other shrubs	SSSS	5-10	5-10	5-10	2-5	2-5	2-5
Utah juniper	JUOS	---	---	---	---	5-10	---
Range site symbol		026X025N	026X025N	026X025N	026X016N	026X017N	026X024N
Potential production (lb/acre):							
Favorable years		400	400	400	600	700	400
Normal years		300	300	300	600	600	300
Unfavorable years		200	200	200	400	500	200

TABLE 45.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants or major soils and inclusions			
		Soil name	Inclusion number--		
		Polistone	1	2	3
Thurber needlegrass	STTK2	20-40	20-40	---	---
Bluegrass	PCA++	5-15	15	---	---
Indian ricegrass	ORHY	5-10	5-10	10-15	5-15
Bottlebrush squiritetail	SIHY	5-10	5-10	5-10	---
Needlegrass	ST PA	---	---	20-40	---
Desert needlegrass	STSP3	---	---	---	2-5
Other perennial grasses	PPCG	5-10	5-10	5-15	---
Perennial forbs	PPFT	5-10	5-10	5-15	1-3
Annual forbs	AAFT	1-3	1-3	2-5	1-2
Low sagebrush	APAR2	10-20	10-10	---	---
Littleleaf horsebrush	TEGL	2-5	2-5	---	---
Wyoming big sagebrush	ARTRM*	---	---	5-10	20-40
Ephedra	EPHD	---	---	2-8	---
Anderson greasewood	FRAN	---	---	2-5	---
Douglas rabbitbrush	CIV18	---	---	2-5	---
Spruce hopsage	GESE	---	---	2-5	15-30
Other shrubs	SSSS	5-10	5-10	2-5	2-5
Range site symbol		026X025N	026X025N	026X016N	026X024N
Potential production (lb/acre):					
Favorable years		400	400	800	400
Normal years		300	300	600	300
Unfavorable years		200	200	400	200

TABLE 46.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclussions			
		Soil name		Inclusion numbers	
		Fultone	Kern	+	-
Plummer needlegrass	STTH2	20-40	20-40	---	---
Bluegrass	PA++	5-15	5-15	---	---
Indian ricegrass	ORHY	5-10	5-10	10-15	5-15
Bottlebrush squirreltail	SIHY	5-10	5-10	5-10	---
Needlegrass	STIPA	---	---	20-40	---
Low-lying dicotyledons	STIP2	---	---	---	2-5
Other perennial grasses	FPGG	5-10	5-10	5-15	---
Perennial forbs	PFFP	5-10	5-10	5-15	1-3
Annual forbs	AAFF	1-3	1-3	2-5	1-2
Low sagebrush	APAR6	1-10	10-20	---	---
Littleleaf horsebrush	TEGL	2-5	2-5	---	---
Wyoming big sagebrush	ARTRH*	---	---	5-10	20-40
Ephedra	EPHED	---	---	2-8	---
Arctostaphylos	ARAC4	---	---	2-5	---
Douglas rabbitbrush	CHV18	---	---	2-5	---
Spiny hopsage	GRSP	---	---	2-5	15-30
Other shrubs	SSSE	5-10	5-10	2-5	2-5
Range site symbol		026X025N	026X025N	026X016N	026X024N
Potential production (lb/acre):					
Favorable years		400	400	400	400
Normal years		300	300	300	300
Unfavorable years		200	200	400	200

TABLE 47.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name	Inclusion number--	
		Ackley	1	2
Needlegrass	STPA	20-40	---	---
Indian ricegrass	ORHY	10-15	5-10	5-15
Bottlebrush squawtail	SIHY	5-10	5-10	---
Thunder needlegrass	STTh2	---	20-40	---
Bluegrass	POA++	---	5-15	---
Desert needlegrass	STSP3	---	---	2-5
Other perennial grasses	PPGG	5-15	5-10	---
Perennial forbs	PPFF	5-15	5-10	1-3
Annual forbs	AAFF	2-5	1-3	1-2
Wyoming big sagebrush	ARTW+	5-10	---	20-40
Ephedra	EPHE2	2-8	---	---
Anderson peachbrush	PRAN2	2-5	---	---
Douglas rabbitbrush	CHV18	2-5	---	---
Spiny hopsage	GRSP	2-5	---	15-30
Low sagebrush	ARAP8	---	10-20	---
Littleleaf horsebrush	TEGL	---	2-5	---
Other shrubs	SSSS	2-5	5-10	2-5
Range site symbol		026X0.6N	026X025N	026X024N
Potential production (lb/acre):				
Favorable years		800	400	400
Normal years		600	300	300
Unfavorable years		400	200	200



TABLE 48.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name		Inclusion number--
		Ackley	Veta	1
Needlegrass	STPA	20-40	---	---
Indian ricegrass	ORPY	10-15	5-15	5-10
Bottlebrush squirreltail	SIMY	5-10	---	5-10
Desert needlegrass	STSP3	---	2-5	---
Thurber needlegrass	STP2	---	---	20-40
Bluegrass	PCA**	---	---	5-15
Other perennial grasses	PVOC	5-15	---	5-10
Perennial forbs	PFFF	5-15	1-3	5-10
Annual forbs	AAFF	2-5	1-2	1-3
Wyoming big sagebrush	ARTRW*	5-10	20-40	---
Ephedra	EP/ED	2-8	---	---
Anderson peachbrush	PLAN2	2-5	---	---
Douglas rabbitbrush	CHV18	1-5	---	---
Spiny hopsage	GRSP	2-5	15-30	---
Low sagebrush	APARB	---	---	10-40
Littleleaf horaebrush	TECL	---	---	2-5
Other shrubs	SSSS	1-5	2-5	5-10
Range site symbol		026X016N	026X024N	026X025N
Potential production (lb/acre.):				
Favorable years		800	400	400
Normal years		600	300	300
Unfavorable years		400	200	200

TABLE 49.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community.]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions						
		Soil name			Inclusion number--			
		Xmar	Zephar	Hazel	1	2	3	4
Thurber needlegrass	STTHZ	20-40	15-20	---	20-35	2-5	5-15	---
Bluegrass	POA++	5-15	---	5-10	---	---	---	---
Indian ricegrass	ORHY	5-10	5-10	---	5-10	---	2-5	---
Bottlebrush squirreltail	SIHY	5-10	---	1-10	10-15	5-10	2-5	---
Basin wildrye	ELC12	---	2-5	---	5-10	---	---	---
Needlegrass	STIPA	---	---	20-35	---	---	---	---
Desert needlegrass	STSP3	---	---	---	---	15-25	30-50	---
Sandberg bluegrass	POSE	---	---	---	---	---	2-5	---
Other perennial grasses	PFGE	5-10	5-12	5-10	5-10	2-5	2-5	---
Perennial forbs	PPFP	5-10	1-5	5-15	5-12	5-10	5-15	---
Annual forbs	AAFP	1-3	2-5	2-5	2-5	2-5	1-3	---
Low sagebrush	ARARS	10-20	---	10-20	---	---	---	---
Littleleaf horsebrush	TEGL	2-5	---	---	---	---	---	---
Wyoming big sagebrush	ARTRM*	---	10-20	---	10-15	15-20	5-10	---
Antelope bitterbrush	PUR2	---	5-10	2-5	5-10	---	---	---
Douglas rabbitbrush	CHV18	---	2-5	2-5	2-5	2-5	2-5	---
Purple sage	SACA9	---	---	2-5	---	---	5-10	---
Green ophedra	EFV1	---	---	---	2-5	5-15	---	---
Spiny hopsage	GRSP	---	---	---	---	2-5	---	---
Ephedra	EPHED	---	---	---	---	---	5-10	---
Horsebrush	TETRA3	---	---	---	---	---	2-5	---
Other shrubs	SSSS	5-10	2-5	5-15	2-10	2-5	2-5	---
Utah juniper	JUOS	---	5-10	---	---	---	---	---
Juniper	JUNIP	---	---	---	---	2-5	---	---
Other trees	TTTT	---	---	2-5	1-2	---	1-2	---
Range site symbol		026X025N	026X017N	026X050N	026X015N	026X022N	026X011N	---
Potential production (lb/acre):								
Favorable years		400	00	400	700	600	800	---
Normal years		300	600	250	600	450	600	---
Unfavorable years		200	500	100	450	300	400	---

TABLE 50.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

The letter 'T' means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions						
		Soil name			Inclusion number--			
		Asian	Opie	Old Camp	1	2	3	4
Thunder needlegrass	STTH1	20-40	20-40	2-5	---	5-15	---	20-35
Bluegrass	POA++	5-15	5-15	---	5-10	---	---	---
Indian ricegrass	ORRY	5-10	5-10	---	2-5	5	---	5-10
Bottlebrush squirreltail	SIHY	5-10	5-10	5-10	5-10	2-5	---	10-15
Desert needlegrass	STSP3	---	---	5-25	---	2-50	---	---
Needlegrass	STIPA	---	---	---	20-35	---	---	---
Sandberg bluegrass	POSE	---	---	---	---	2-5	---	---
Basin wildrye	ELC12	---	---	---	---	---	---	5-10
Other perennial grasses	PPGG	5-10	5-10	2-5	10	2-5	---	5-10
Perennial forbs	PFFF	5-10	5-10	5-10	5-15	5-5	---	5-12
Annual forbs	AAFF	1-5	1-5	2-5	2-5	2-5	---	2-5
Low sagebrush	ARAR8	10-20	10-10	---	1-5	---	---	---
Little bluestem	TRBL	2-5	2-5	---	---	---	---	---
Wyoming big sagebrush	ARTK*	---	---	15-20	---	5-10	---	10-15
Green ephedra	EPV1	---	---	5-15	---	---	---	2-5
Douglas rabbitbrush	CHV18	---	---	2-5	2-5	2-5	---	2-5
Spiny hopsage	GRSF	---	---	2-5	---	---	---	---
Purple sage	SACA9	---	---	---	2-5	5-10	---	---
Antelope bitterbrush	PUTR2	---	---	---	2-5	---	---	5-10
Ephedra	EPVED	---	---	---	---	5-1	---	---
Horsebrush	TETRA3	---	---	---	---	2-5	---	---
Other shrubs	SSSS	5-10	5-10	2-5	5-15	2-5	---	2-10
Juniper	JUNIP	---	---	2-5	---	---	---	---
Other trees	TTTT	---	---	---	2-5	T-2	---	T-2
Range site symbol		026X011N	---	026X015N	026X025N	026X025N	026X022N	026X050N
Potential production (lb/acre):								
Favorable years		800	---	700	400	400	600	400
Normal years		600	---	600	300	300	450	250
Unfavorable years		400	---	450	200	200	300	100

TABLE 51.--PANGELAND PLANTS AND WOODLAND UNDERSTORY

[An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions			
		Soil name		Inclusion number--	
		Xman	Duco	1	2
Thurber needlegrass	STN2	20-40	---	---	---
Bluegrass	POA++	5-15	---	X	---
Indian ricegrass	ORHY	5-10	X	---	---
Bottlebrush squirreltail	SIHY	5-10	X	X	---
Needlegrass	STIPA	---	X	---	---
Pine bluegrass	POSC	---	X	---	---
Sedge	CAREX	---	---	X	---
Other perennial grasses	PPGG	5-10	X	X	---
Perennial forbs	PPFF	5-10	X	X	---
Annual forbs	AAFF	1-3	X	X	---
Low sagebrush	ARAB	10-20	---	---	---
Singleleaf horsebrush	TEGL	2-5	---	---	---
Mountain big sagebrush	ARTAV	---	X	---	---
Antelope bitterbrush	PUTR2	---	X	X	---
Green sphaeralcea	EPV	---	X	---	---
Eriogonum	ERIOG	---	---	X	---
Serviceberry	AMELA	---	---	X	---
Phlox	PHLOX	---	---	X	---
Anderson peachbrush	PRAN2	---	---	X	---
Other shrubs	SSSS	5-10	X	X	---
Singleleaf pinyon	PINO	---	X	---	---
Utah juniper	JUOS	---	X	---	---
Ponderosa pine	PIPO	---	---	X	---
Jeffrey pine	PIJE	---	---	X	---
Range site symbol		026X025N	---	---	---
Woodland site symbol		---	026X060N	026X065N	---
Potential production (lb/acre):					
Favorable years		400	300	75	---
Normal years		300	225	50	---
Unfavorable years		200	150	25	---

TABLE 52.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight of plants on major soils and inclusions)						
		Soil name			Inclusion number			
		Indiana	Duco	Cagle	1	2	3	4
Needlegrass	STPA	25-40	X	X	---	---	---	20-35
Basin wildrye	ELCI2	10-20	---	---	---	5-10	---	10-20
Bluegrass	POA++	5-10	---	---	---	---	---	5-10
Bottlebrush squirreltail	SIRY	2-5	X	X	5-10	10-15	20-50	---
Pine bluegrass	POSC	---	X	X	---	---	---	---
Indian ricegrass	ORRY	---	X	X	---	5-10	---	---
Desert needlegrass	STSP3	---	---	---	15-25	---	---	---
Thurber needlegrass	STTH2	---	---	---	2-5	20-35	---	---
Sandberg bluegrass	POSF	---	---	---	---	---	5-10	---
Mountain brome	BRHA4	---	---	---	---	---	---	10-20
Other perennial grasses	PPGG	5-10	X	X	2-5	5-10	2-10	5-15
Specklepod milkvetch	ASLES	---	---	---	---	---	2-5	---
Onion	ALLIU	---	---	---	---	---	1-3	---
Other perennial forbs	PPFF	5-15	X	X	5-10	5-12	---	5-15
Annual forbs	AAFF	1-3	X	X	2-5	2-5	1-5	2-5
Wyoming big sagebrush	ARTRN*	5-15	---	---	15-20	10-15	0-10	---
Antelope bitterbrush	PUTR1	5-10	X	X	---	5-10	---	5-15
Mountain big sagebrush	ARTRV	---	X	X	---	---	---	5-10
Green ophodra	EPV1	---	X	X	5-15	2-5	---	---
Douglas rattailbrush	CHV78	---	---	---	2-5	2-5	---	---
Spiny hopsage	GRSP	---	---	---	2-5	---	2-5	---
Low sagebrush	ANARB	---	---	---	---	---	5-15	---
Littleleaf horsebrush	TEGL	---	---	---	---	---	2-5	---
Other shrubs	SSSS	5-10	X	X	2-5	2-10	2-10	5-15
Singleleaf pinyon	PINO	---	X	X	---	---	---	---
Utah juniper	JUOS	---	X	X	---	---	---	---
Juniper	JUNIP	---	---	---	2-5	---	---	---
Other trees	TTTT	T-2	---	---	---	T-2	---	---
Range site symbol		026X010M	---	---	026X022N	026X015N	026X027N	026X005N
Woodland site symbol		---	026X060N	026X060N	---	---	---	---
Potential production (lb/acre):								
Favorable years		900	300	300	600	700	400	1,500
Normal years		700	225	225	450	600	300	1,200
Unfavorable years		600	150	150	300	450	200	800

TABLE 53.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions			
		Soil name		Inclusion number--	
		Indiana	Devada	1	2
Needlegrass	STPA	25-40	---	---	---
Basin wildrye	ELC12	10-20	---	---	---
Bluegrass	POA++	5-10	10-20	10-20	---
Bottlebrush squirreltail	SIRY	2-5	5-10	5-10	---
Thurber needlegrass	STTH2	---	15-35	15-35	---
Other perennial grasses	PPGG	5-10	5-10	5-10	---
Perennial forbs	PPFF	5-15	5-15	5-15	---
Annual forbs	AAFF	1-3	2-5	2-5	---
Wyoming big sagebrush	ARTW*	5-15	---	---	---
Antelope bitterbrush	PCTR2	5-10	2-5	2-5	---
Low sagebrush	ARAR8	---	5-20	5-20	---
Douglas rabbitbrush	CHY18	---	2-5	2-5	---
Other shrubs	SSSS	5-10	1-5	1-5	---
Trees	TTTT	T-2	---	---	---
Range site symbol		026X010W	026X023N	026X023N	---
Potential production (lb/acre):					
Favorable years		900	500	500	---
Normal years		700	400	400	---
Unfavorable years		600	300	300	---

TABLE 54.—RANGELAND PLANTS AND WOODLAND UNDERSTORY

[An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions						
		Soil name			Inclusion number--			
		Temuro	Indiana	Oppio	1	2	3	4
Needlegrass	BTIPA	X	25-40	---	20-35	25-40	---	---
Pine bluegrass	POSC	X	---	---	---	---	---	---
Indian ricegrass	ORHY	X	---	---	---	---	---	---
Bottlebrush squirreltail	SBHY	X	5-5	5-10	---	2-5	X	---
Basin wildrye	ELC12	---	10-20	---	10-20	10-20	---	---
Bluegrass	POR++	---	5-10	10-20	5-10	5-10	X	---
Thurber needlegrass	ETH2	---	---	15-35	---	---	---	---
Mountain brome	BRMA4	---	---	---	10-20	---	---	---
Sedge	CAREX	---	---	---	---	---	X	5-10
Tufted hairgrass	DECA5	---	---	---	---	---	---	20-30
Nevada bluegrass	PONE3	---	---	---	---	---	---	15-25
Meadow barley	HOBR2	---	---	---	---	---	---	10-25
Alpine timothy	PHAL2	---	---	---	---	---	---	10-25
Kush	JUNCL	---	---	---	---	---	---	5-10
Other perennial grasses	PPGG	X	5-10	5-10	5-15	5-10	X	2-10
Perennial forbs	PPFF	X	5-15	5-15	5-15	5-15	X	10-20
Annual forbs	AAFF	X	1-3	2-5	2-5	1-3	X	---
Mountain big sagebrush	ARTRV	X	---	---	5-10	---	---	---
Antelope bitterbrush	PUTR2	X	5-10	2-5	5-15	5-10	X	---
Green sphaerol	EPVI	X	---	---	---	---	---	---
Wyoming big sagebrush	ARTRW*	---	5-15	---	---	5-15	---	---
Low sagebrush	ARAR8	---	---	5-20	---	---	---	---
Douglas rabbitbrush	CHV18	---	---	2-5	---	---	---	---
Eriogonum	ERIOG	---	---	---	---	---	X	---
Serviceberry	AMELA	---	---	---	---	---	X	---
Philox	PHLOX	---	---	---	---	---	X	---
Anderson peachbrush	PRAN1	---	---	---	---	---	X	---
Other shrubs	SSSS	X	5-10	1-5	5-15	5-10	X	2-5
Singleleaf pinyon	PIMO	X	---	---	---	---	---	---
Utah juniper	JUOG	X	---	---	---	---	---	---
Ponderosa pine	PIPO	---	---	---	---	---	X	---
Jeffrey pine	PIJL	---	---	---	---	---	X	---
Willow	SALIX	---	---	---	---	---	---	2-5
Other trees	TTTT	---	T-2	---	---	T-2	---	---
Range site symbol	---	026X010N	026X023N	026X005N	026X010N	---	026X003N	---
Woodland site symbol	026X060N	---	---	---	---	026X060N	---	---
Potential production (lb/acre):								
Favorable years	300	900	500	1,500	900	75	2,000	
Normal years	225	700	400	1,100	700	50	1,500	
Unfavorable years	150	600	300	800	600	25	1,000	

TABLE 55.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions					
		Soil name			Inclusion number--		
		Xerta	Devada	Inter	1	2	3
Thurber needlegrass	STTH2	15-35	15-35	---	---	---	---
Bluegrass	POA++	10-20	10-20	5-10	---	5-10	---
Bottlebrush squirreltail	SIHY	5-10	5-10	---	X	2-5	---
Needlegrass	STLPA	---	---	20-35	X	25-40	---
Mountain brome	BRMA4	---	---	10-20	---	---	---
Basin wildrye	ELC12	---	---	10-20	---	10-20	---
Pine bluegrass	POSC	---	---	---	X	---	---
Indian ricegrass	ORRY	---	---	---	X	---	---
Other perennial grasses	PPGG	5-10	5-10	5-15	X	5-10	---
Perennial forbs	PPFP	5-15	5-15	5-15	X	5-15	---
Annual forbs	AAFP	2-5	2-5	2-5	X	1-3	---
Low sagebrush	ARARS	5-20	5-20	---	---	---	---
Antelope bitterbrush	PCTR2	2-5	2-5	5-15	X	5-10	---
Douglas rabbitbrush	CN18	2-5	2-5	---	---	---	---
Mountain big sagebrush	ASTRV	---	---	5-10	X	---	---
Green sagebrush	EDVI	---	---	---	X	---	---
Wyoming big sagebrush	APTRW*	---	---	---	---	5-15	---
Other shrubs	SSSS	1-5	1-5	5-15	X	5-10	---
Singleleaf pinyon	PINO	---	---	---	X	---	---
Utah juniper	JUOS	---	---	---	X	---	---
Other trees	TTTT	---	---	---	---	7-2	---
Range site symbol		026X023N	026X023N	026X005N	---	026X010N	---
Woodland site symbol		---	---	---	026X060N	---	---
Potential production (lb/acre):							
Favorable years		500	500	1,500	300	900	---
Normal years		400	400	1,100	225	700	---
Unfavorable years		300	300	800	150	600	---



TABLE 56.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community.

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name		Inclusion number--		
		Burnberough	Gabica	1	2	3
Needlegrass	STIPA	20-35	10-25	20-35	---	---
Mountain brome	BRMA4	10-20	---	10-20	---	---
Basin wildrye	ELCI2	10-20	---	10-20	---	---
Bluegrass	POA++	5-10	5-10	5-10	---	10-20
Prairie junegrass	KOCR	---	2-5	---	---	---
Thurber needlegrass	STTN2	---	---	---	---	15-35
Bottlebrush squirreltail	SINY	---	---	---	---	5-10
Other perennial grasses	PPGG	5-15	10-15	5-15	---	5-10
Perennial forbs	PPFF	5-15	5-15	5-15	---	5-15
Annual forbs	AAPF	2-5	2-5	2-5	---	2-5
Antelope bitterbrush	PUTR2	5-15	---	5-15	---	2-5
Mountain big sagebrush	ANTRV	5-10	---	5-10	---	---
Low sagebrush	AJAK8	---	20-30	---	---	5-20
Douglas rabbitbrush	CHV18	---	---	---	---	2-5
Other shrubs	SSSS	5-15	5-15	5-15	---	2-5
Range site symbol		026X005N	026X028N	026X005N	---	026X023N
Potential production (lb/acre);						
Favorable years		1,500	350	1,500	---	500
Normal years		1,100	250	1,100	---	400
Unfavorable years		800	150	800	---	300

TABLE 57.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production dry weight of plants on major soils and inclusions			
		Soil name		Inclusion number--	
		Cogle	Monrac	1	2
Needlegrass	STIPA	X	20-35	X	---
Pine bluegrass	POSC	X	---	X	---
Indian ricegrass	ORHY	X	---	X	---
Bottlebrush squarreltail	SIHY	X	---	X	5-10
Mountain brome	BRMA4	---	10-20	---	---
Basin wildrye	ELC12	---	10-20	---	---
Bluegrass	PCA++	---	5-10	---	---
Desert needlegrass	STSP3	---	---	---	15-25
Thurber needlegrass	STTH2	---	---	---	2-5
Other perennial grasses	PPGG	X	5-15	X	2-5
Perennial forbs	PPFF	X	5-15	X	5-10
Annual forbs	AAFF	X	2-5	X	2-5
Mountain big sagebrush	ARTRV	X	5-10	X	---
Antelope bitterbrush	PUTR2	X	5-15	X	---
Green ophodra	EPV1	X	---	X	5-15
Wyoming big sagebrush	ARTRW*	---	---	---	15-20
Douglas rabbitbrush	CHV18	---	---	---	2-5
Spray hopsage	GRSP	---	---	---	2-5
Other shrubs	SSSS	X	5-15	X	2-5
Singleleaf pinyon	PIMO	X	---	X	---
Utah juniper	JUOS	X	---	X	---
Juniper	JUNIP	---	---	---	2-5
Range site number		---	026X005N	---	026X022N
Woodland site number		026X060N	---	026X060N	---
Potential production (lb/acre):					
Favorable years		300	1,500	300	600
Normal years		225	1,100	225	450
Unfavorable years		150	800	150	300

TABLE 58.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight of plants on major soils and inclusions)					
		Soil name			Inclusion number--		
		Duro	Smallcone	Cagle	1	2	3
Needlegrass	STPA	X	---	X	5-40	---	---
Pine bluegrass	POSC	X	---	X	---	---	---
Indian ricegrass	ORRY	X	---	X	---	---	5-10
Bottlebrush squirreltail	SIMY	X	X	X	2-5	---	10-15
Sedge	CAREX	---	X	---	---	---	---
Bluegrass	POA++	---	X	---	5-10	---	---
Basin wildrye	ELCI2	---	---	---	10-20	---	5-10
Thurber needlegrass	STTH2	---	---	---	---	---	20-35
Other perennial grasses	PPGG	X	X	X	5-10	---	5-10
Perennial forbs	PPFF	X	X	X	5-15	---	5-12
Annual forbs	AAPF	X	X	X	1-3	---	2-5
Mountain big sagebrush	ARTRV	X	---	X	---	---	---
Antelope bitterbrush	FUTR2	X	X	X	5-10	---	5-10
Green sphedra	EPVI	X	---	X	---	---	2-5
Eriogonum	ERIOG	---	X	---	---	---	---
Serviceberry	AMELA	---	X	---	---	---	---
Phlox	PHLOX	---	X	---	---	---	---
Anderson peachbrush	PRAN2	---	X	---	---	---	---
Wyoming big sagebrush	ARTKM*	---	---	---	5-15	---	10-15
Douglas rabbitbrush	CHVIS	---	---	---	---	---	2-5
Other shrubs	SSSS	X	X	X	5-10	---	2-10
Singleleaf pinyon	PIMO	X	---	X	---	---	---
Utah juniper	JUOS	X	---	X	---	---	---
Ponderosa pine	PIPO	---	X	---	---	---	---
Jeffrey pine	PIJE	---	X	---	---	---	---
Other trees	TTTT	---	---	---	T-2	---	T-2
Range site symbol		---	---	---	026X010N	---	026X015N
Woodland site symbol		026X060N	026X065N	026X060N	---	---	---
Potential production (lb/acre):							
Favorable years		300	75	300	900	---	700
Normal years		225	50	225	700	---	600
Unfavorable years		150	25	150	600	---	450

TABLE 59.—RANGELAND PLANTS AND WOODLAND UNDERSTORY

An X indicates that the named plant is in the potential native woodland understory and the percentage is highly variable. The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions			
		Soil name		Inclusion number--	
		Duco	Springmeyer	1	2
Needlegrass	STPA	X	25-40	25-40	X
Pine bluegrass	POSC	X	---	---	X
Indian ricegrass	ORHY	X	---	---	X
Bottlebrush squirreltail	SINY	X	2-5	2-5	X
Basin wildrye	ELCI2	---	10-20	10-20	---
Bluegrass	POA++	---	5-10	5-10	---
Other perennial grasses	PPGG	X	5-10	5-10	X
Perennial forbs	PPFP	X	5-15	5-15	X
Annual forbs	AAFP	X	1-3	1-3	X
Mountain big sagebrush	ARTRV	X	---	---	X
Antelope bitterbrush	PUTR2	X	5-10	5-10	X
Green sphaera	EPV1	X	---	---	X
Wyoming big sagebrush	AKTRW*	---	5-15	5-15	---
Other shrubs	SSSS	X	5-10	5-10	X
Single-leaf pinyon	PIWO	X	---	---	X
Utah juniper	JUOS	X	---	---	X
Other trees	TTTT	---	T-2	T-2	---
Range site symbol		---	026X010N	026X010N	---
Woodland site symbol		026X060N	---	---	026X060N
Potential production (lb/acre):					
Favorable years		300	900	900	300
Normal years		225	700	700	225
Unfavorable years		150	600	600	150

TABLE 60.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions						
		Component name			Inclusion number--			
		Manogue	Devada	Rock outcrop	1	2	3	4
Bottlebrush squirreltail	SNIV	20-50	5-10	---	5-10	5-10	2-5	---
Sandberg bluegrass	POSE	5-10	---	---	---	---	---	---
Thurber needlegrass	STTH2	---	15-35	---	15-35	15-35	---	---
Bluegrass	POA++	---	10-20	---	10-20	10-20	5-10	---
Needlegrass	STIPA	---	---	---	---	---	25-40	---
Basin wildrye	ELC12	---	---	---	---	---	10-20	---
Tufted hairgrass	DECA5	---	---	---	---	---	---	20-30
Nevada bluegrass	PONE3	---	---	---	---	---	---	15-25
Meadow barley	HOBR2	---	---	---	---	---	---	10-15
Alpine timothy	PHAL2	---	---	---	---	---	---	10-15
Rush	JUNCU	---	---	---	---	---	---	5-10
Sedge	CAREX	---	---	---	---	---	---	5-10
Other perennial grasses	PFGG	2-10	5-10	---	5-10	5-10	5-10	2-10
Specklepod milkvetch	ASLE8	2-5	---	---	---	---	---	---
Onion	ALLIU	1-3	---	---	---	---	---	---
Other perennial forbs	PFFP	---	3-15	---	5-15	5-15	5-15	10-20
Annual forbs	AAPF	1-5	2-5	---	2-5	2-5	1-3	---
Low sagebrush	ARAB8	5-15	5-20	---	5-20	5-20	---	---
Wyoming big sagebrush	ARTRW*	0-10	---	---	---	---	5-15	---
Littleleaf horsebrush	TEXL	2-5	---	---	---	---	---	---
Spiny hopsage	GRSP	2-5	---	---	---	---	---	---
Low sagebrush	ARABP	---	5-20	---	5-20	5-20	---	---
Antelope bitterbrush	PURP*	---	2-5	---	2-5	2-5	5-10	---
Douglas rabbitbrush	CHV18	---	2-5	---	2-5	2-5	---	---
Other shrubs	SSSS	2-10	1-5	---	1-5	1-5	5-10	2-5
Willow	SALIX	---	---	---	---	---	---	2-5
Other trees	TITT	---	---	---	---	---	T-2	---
Range site symbol		026X027N	026X023N	---	026X023N	026X023N	026X010N	026X003N
Potential production (lb/acre):								
Favorable years		400	500	---	500	500	900	2,000
Normal years		300	400	---	400	400	700	1,500
Unfavorable years		200	300	---	300	300	600	1,000

TABLE 61.—RANGELAND PLANTS AND WOODLAND UNDERSTORY

[The letter "T" means trace. Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions				
		Soil name		Inclusion number--		
		Manogue	Springmeyer	1	2	3
Bottlebrush squarreltail	SIWY	20-50	2-5	5-10	---	2-5
Sandberg bluegrass	POSE	5-10	---	---	---	---
Needlegrass	STIPA	---	25-40	---	---	25-40
Basin wildrye	ELCI2	---	10-20	---	35-60	10-20
Bluegrass	POA++	---	5-10	5-15	---	5-10
Thurber needlegrass	STTR2	---	---	20-40	---	---
Indian ricegrass	ORHY	---	---	5-10	---	---
Nevada bluegrass	PONE3	---	---	---	5-10	---
Sedge	CAREX	---	---	---	2-5	---
Other perennial grasses	PPGG	2-10	5-10	5-10	5-15	5-10
Specklepod milkvetch	ASLE8	2-5	---	---	---	---
Onion	ALLIU	1-3	---	---	---	---
Other perennial forbs	PPFF	---	5-15	5-10	5-15	5-15
Annual forbs	AAFF	1-5	1-3	1-3	2-5	1-3
Low sagebrush	ARARS	5-15	---	10-20	---	---
Wyoming big sagebrush	ARTRW*	0-10	5-15	---	---	5-15
Littleleaf horsebrush	TEGL	2-5	---	2-5	---	---
Spiny hopsage	GRSP	2-5	---	---	---	---
Antelope bitterbrush	PUTR2	---	5-10	---	---	5-10
Big sagebrush	AKTR2	---	---	---	10-15	---
Other shrubs	SSSS	2-10	5-10	5-10	5-10	5-10
Trees	TTTT	---	T-2	---	---	T-2
Range site symbol		026X027A	026X010A	026X025N	026X030N	026X010N
Potential production (lb/acre):						
Favorable years		400	900	400	2,500	900
Normal years		300	700	300	2,000	700
Unfavorable years		200	600	300	1,500	600

TABLE 62.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions		
		Soil name	Inclusion number--	
		Manogue	1	2
Bottlebrush squirreltail	SIRY	20-50	5-10	---
Sandberg bluegrass	POSE	5-10	---	---
Thurber needlegrass	STTR2	---	15-35	---
Bluegrass	PCA**	---	10-20	---
Other perennial grasses	PPGG	2-10	5-10	---
Specklepod milkvetch	ASLE8	2-5	---	---
Onion	ALLIU	1-3	---	---
Perennial forbs	PPPT	---	5-15	---
Annual forbs	AAPT	1-5	2-5	---
Low sagebrush	ARAB8	5-15	---	---
Wyoming big sagebrush	ARTR**	0-10	---	---
Littleleaf horsebrush	TEGL	2-5	---	---
Spiny hopsage	GRSP	2-5	---	---
Low sagebrush	ARAB8	---	5-20	---
Antelope bitterbrush	PUTR2	---	2-5	---
Douglas rabbitbrush	CHV18	---	2-5	---
Other shrubs	SSSS	2-10	1-5	---
Range site symbol		026X027N	026X023N	---
Potential production (lb/acre):				
Favorable years		400	500	---
Normal years		300	300	---
Unfavorable years		200	300	---

TABLE 63.--RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major components and inclusions					
		Component name			Inclusion number--		
		Manogue	Refed	Rock outcrop	1	2	3
Bottlebrush squirttail	SIHY	20-30	5-10	---	5-10	5-10	---
Sandberg bluegrass	POSE	5-10	---	---	---	---	---
Desert needlegrass	STSP3	---	15-25	---	---	15-25	---
Thurber needlegrass	STH2	---	2-5	---	20-40	2-5	---
Bluegrass	POA++	---	---	---	5-15	---	---
Indian ricegrass	ORHY	---	---	---	5-10	---	---
Other perennial grasses	PPGG	2-10	2-5	---	5-10	2-5	---
Specklepod milkvetch	ASLES	2-5	---	---	---	---	---
Onion	ALLIU	1-3	---	---	---	---	---
Perennial forbs	PPFF	---	5-10	---	5-10	5-10	---
Annual forbs	AAFF	1-5	2-5	---	1-5	2-5	---
Low sagebrush	AFARS	5-15	---	---	10-20	---	---
Wyoming b g sagebrush	AFTRW*	0-10	15-20	---	---	15-20	---
Littleleaf horsebrush	TFGL	2-5	---	---	2-5	---	---
Spiny hop sage	GRSP	2-5	2-5	---	---	2-5	---
Green opheion	EPVI	---	5-15	---	---	5-15	---
Douglas rabbitbrush	CHVIB	---	2-5	---	---	2-5	---
Other shrubs	SSSB	2-10	2-5	---	5-10	2-5	---
Juniper	JUNIP	---	2-5	---	---	2-5	---
Range site symbol		026X027N	026X022N	---	026X025N	026X022N	---
Potential production (lb/acre):							
Favorable years		400	600	---	400	600	---
Normal years		300	450	---	300	450	---
Unfavorable years		200	300	---	200	300	---



TABLE 64.—RANGELAND PLANTS AND WOODLAND UNDERSTORY

[Absence of an entry indicates that the named plant is not a key species in the potential native plant community]

Common plant name	Plant symbol	Percentage composition and production (dry weight) of plants on major soils and inclusions			
		Soil name	Inclusion number--		
		Manogue	1	2	3
Bottlebrush squirreltail	SIHY	20-30	5-10	5-10	---
Sandberg bluegrass	POSE	5-10	---	---	---
Thurber needlegrass	STTH2	---	20-40	2-5	---
Bluegrass	POA++	---	5-15	---	---
Indian ricegrass	ORHY	---	5-10	---	---
Desert needlegrass	STSP3	---	---	15-25	---
Other perennial grasses	PFGG	2-10	5-10	2-5	---
Specklepod milkvetch	ASLEB	2-5	---	---	---
Onion	ALLIU	1-3	---	---	---
Other perennial forbs	PTFF	---	5-10	5-10	---
Annual forbs	AAFF	1-5	1-3	2-5	---
Low sagebrush	ARAB8	5-15	10-20	---	---
Wyoming big sagebrush	ARTRW*	0-10	---	15-20	---
Littleleaf horsebrush	TEGL	2-5	2-5	---	---
Sprny hopsage	GRSP	2-5	---	2-5	---
Green ephedra	EPVI	---	---	5-15	---
Douglas rabbitbrush	CHV18	---	---	2-5	---
Other shrubs	SSSS	2-10	5-10	2-5	---
Juniper	JUNIP	---	---	2-5	---
Range site symbol		026X027N	026X025N	026X022N	---
Potential production (lb/acre):					
Favorable years		400	200	600	---
Normal years		300	200	450	---
Unfavorable years		200	200	300	---

TABLE 65.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-80 at Virginia City, NV]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>Units</u>	<u>In</u>	<u>In</u>	<u>In</u>		<u>In</u>
January-----	41.1	24.2	32.7	59	5	36	2.03	0.49	3.25	5	9.8
February-----	44.4	26.2	35.3	61	8	42	1.63	0.32	2.64	4	11.6
March-----	48.3	28.8	38.6	66	12	101	1.27	0.18	2.09	3	7.1
April-----	54.8	33.5	44.2	74	17	193	0.56	0.13	0.89	2	2.1
May-----	63.9	41.4	52.7	84	22	410	0.90	0.10	1.51	3	1.0
June-----	74.2	50.2	62.2	93	32	666	0.69	---	1.18	2	0.0
July-----	83.2	58.0	70.6	94	42	949	0.39	---	0.51	1	0.0
August-----	80.9	55.9	68.4	94	37	880	0.43	---	0.73	1	0.0
September---	73.6	49.6	61.6	89	30	648	0.47	---	0.82	1	0.0
October-----	61.9	40.2	51.1	80	20	357	0.61	---	1.05	2	0.9
November-----	49.7	31.2	40.5	70	13	104	1.03	0.21	1.68	3	5.2
December-----	42.8	25.6	34.2	61	4	55	2.00	0.45	3.21	4	12.1
Yearly.											
Average---	59.9	38.7	49.3	---	---	---	---	---	---	---	---
Extreme---	---	---	---	96	1	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,441	11.91	7.41	15.95	31	50.0

\* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 66.--FREEZE DATES IN SPRING AND FALL  
[Recorded in the period 1951-80 at Virginia City, NV]

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 20	June 2	June 16
2 years in 10 later than--	May 11	May 25	June 9
5 years in 10 later than--	April 24	May 11	May 25
First freezing temperature in fall:			
1 year in 10 earlier than--	September 20	September 9	August 22
2 years in 10 earlier than--	October 6	September 25	September 7
5 years in 10 earlier than--	November 4	October 25	October 9

TABLE 67.--GROWING SEASON  
[Recorded in the period 1951-80 at Virginia City,  
NV]

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	148	128	101
8 years in 10	161	139	110
5 years in 10	187	160	128
2 years in 10	215	183	147
1 year in 10	234	198	160

TABLE 58.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
021	Bombardier-Indiana association	369	0.2
051	Old Camp-Hefed-Rock outcrop association	6,058	3.7
052	Old Camp-Rubble land-Rock outcrop complex, 30 to 75 percent slopes	3,091	1.9
054	Old Camp-Old Indiana association	3,340	2.0
060	Cleave-St. Raymond association	1,141	0.7
064	Cleave-Veta association	1,588	1.0
080	Wreckind-Xman-Indiana association	3,969	2.4
120	Springmeyer-Reno association	648	0.4
135	Oppio-Nosrac association	3,340	2.1
137	Oppio-Reywat-Indiana association	876	0.5
150	Tristan-Duco-Zephani association	4,178	2.6
151	Tristan-Burnborough-Gabica association	1,711	1.1
160	Devada-Rock outcrop complex, 5 to 50 percent slopes	926	0.6
161	Devada-Nosrac association	1,569	1.0
162	Devada-Old Camp association	6,563	4.0
170	Satategu-Islede association	734	0.5
180	Patna-Roland association	448	0.3
210	Theon-Lapon-Old association	289	0.2
211	Theon-Rock outcrop-Old Camp association	586	0.4
212	Theon-Singatae association	391	0.2
213	Theon-Old Camp association	7,503	4.6
220	Ister-Devada association	7,942	4.9
221	Ister-Old Camp-Rock outcrop association	1,482	0.9
230	Sago-sandy loam, 0 to 2 percent slopes, occasionally flooded	184	0.1
231	Sago-sandy loam, 0 to 2 percent slopes, rarely flooded	327	0.2
250	Chalco-Reno association	2,564	1.6
261	Lapon-Fulstone-Old association	1,804	1.1
275	Cl. 1. coarse sand, 8 to 30 percent slopes	418	0.3
280	Perazzo very gravelly sandy loam, 2 to 4 percent slopes	112	0.1
281	Perazzo very stony sandy loam, 4 to 15 percent slopes	378	0.2
290	Springmeyer Veta loam, 0 to 2 percent slopes	239	0.1
313	Kisley-Rubble land-Devada association	1,662	1.0
314	Kisley-Xman-Rock outcrop association	691	0.5
350	Lowell gravelly sandy loam, 2 to 4 percent slopes	205	0.1
351	Lowell very gravelly sandy loam, 4 to 15 percent slopes	475	0.3
381	Veta very gravelly sandy loam, 2 to 8 percent slopes	389	0.2
480	Old Camp-Pombardier-Rock outcrop association	2,173	1.3
483	Old Camp-Old Camp-Rock outcrop association	25,784	15.9
484	Old Camp-Old Camp-Ister association	5,474	3.4
485	Old Camp-Chalco-Reno association	2,243	1.4
487	Old Camp-Candle-Oppio association	3,607	2.2
488	Old Camp-Rubble land-Indiana association	2,846	1.8
489	Old Camp-Smallstone-Old Camp association	1,105	0.7
519	Loomer-Zephani-Old association	4,232	2.6
553	Fulstone cobbly loam, 4 to 30 percent slopes	4,331	2.7
554	Fulstone-Reno association	2,679	1.7
571	Ackley gravelly sandy loam, 2 to 4 percent slopes	496	0.3
572	Ackley-Veta complex, 2 to 8 percent slopes	435	0.3
602	Isle-Dumps complex	782	0.5
875	Xman-Zephani-Nosrac association	5,582	3.4
876	Xman-Oppio-Old Camp association	4,682	3.0
877	Xman-Duco association	1,355	0.8
893	Indiana-Duco-Cagle association	2,760	1.7
894	Indiana-Devada association	1,770	1.1
1010	Tegato-Indiana-Oppio association	1,657	1.0
1030	Xerta-Devada-Ister association	1,485	0.9
1410	Burnborough-Gabica association	3,658	2.3
1511	Cagle-Nosrac association	984	0.6
1520	Duco-Smallstone-Cagle association	2,165	1.3
1541	Duco-Springmeyer association	1,077	0.7
1540	Manogue-Devada-Rock outcrop association	6,069	3.7
1531	Manogue-Springmeyer association	649	0.4
1533	Manogue cobbly clay, 2 to 8 percent slopes	315	0.2
1534	Manogue-Hefed-Rock outcrop association	3,395	2.1
1535	Manogue very stony clay, 2 to 15 percent slopes	727	0.4

TABLE 69.--ACRES AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
	Water-----	196	0.1
	Total-----	162,180	100.0

TABLE 69.—BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfills
<b>041*</b> Bombad 1-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Ind.ano-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.
<b>051*</b> Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
Hefco-----	Severe: cutbanks cave, slope.	Severe: slope.	Severe: poor filter, slope.	Severe: slope.	Poor: slope.
Rock outcrop.					
<b>052*</b> Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
Rubble land.					
Rock outcrop.					
<b>044*</b> Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones.
Olat-----	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Indiana-----	Severe: depth to rock slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.
<b>050*</b> Cleaver-----	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: cemented pan.
Stungdon-----	Severe: depth to rock, cemented pan.	Severe: depth to rock.	Severe: depth to rock, cemented pan.	Severe: depth to rock.	Poor: depth to rock.

See footnote at end of table.

TABLE 69.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfill
062*: Cleave-----	Severe cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: cemented pan.
Veta-----	Severe cutbanks cave.	Severe: flood r.s.	Moderate: flooding, large stones.	Moderate: flooding, frost action.	Fair: large stones.
080* Wedekind-----	Severe depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: cemented pan, slope, thin layer.
Xman-----	Severe depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.
Indiana-----	Severe depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.
120* Sjringmeyer-----	Severe cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: percs slowly, slope.	Moderate: slope, frost action, shrink-swell.	Fair: shrink-swell.
Reno-----	Severe cemented pan.	Severe: shrink-swell.	Severe: cemented pan, percs slowly.	Severe: low strength, shrink-swell.	Poor: cemented pan.
135* Oppio-----	Severe depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope, shrink-swell.	Poor: depth to rock, slope, shrink-swell.
Nostack-----	Severe slope.	Severe slope.	Severe: percs slowly, slope.	Severe: slope.	Poor: slope.
137* Oppio-----	Severe depth to rock.	Severe: shrink swell.	Severe: depth to rock, percs slowly.	Severe: shrink-swell.	Poor: depth to rock, shrink-swell.
Raywat-----	Severe depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Indiana-----	Severe depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 69.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfill
150* Tristan-----	Severe: large stones, slope.	Severe: slope, large stones.	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Poor: large stones, slope.
Duco-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, large stones, slope.
Zephan-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.
151* Tristan-----	Severe: large stones, slope.	Severe: slope, large stones.	Severe: percs slowly, slope, large stones.	Severe: slope, large stones.	Poor: large stones, slope.
Burnthorough-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Gabica-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock.
160* Devada-----	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, low strength, slope.	Poor: depth to rock, low strength, slope.
Rock outcrop.					
161* Devada-----	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, low strength, slope.	Poor: depth to rock, low strength.
Nosrac-----	Severe: slope.	Severe: slope.	Severe: percs slowly, slope.	Severe: slope.	Poor: slope.
162* Devada-----	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock.	Severe: depth to rock, low strength.	Poor: depth to rock, low strength.
Oiac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: slope.
Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.

See footnote at end of table.



TABLE 69.—BUILDING SITE DEVELOPMENT—Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfill
176*: Saralegui-----	Slight-----	Slight-----	Slight-----	Slight-----	Good.
Isorde-----	Severe: cutbanks cave.	Moderate: slope.	Severe: poor filter.	Moderate: slope.	Good.
180*: Palma-----	Severe: cutbanks cave.	Moderate: slope.	Severe: poor filter.	Moderate: slope.	Good.
Radiand.					
210*: Theon-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Lapon-----	Severe: depth to rock, cemented pan, slope.	Severe: slope, depth to rock, cemented pan.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Poor: depth to rock, slope.
Olac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: slope.
211*: Theon-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Rock outcrop.					
Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
212*: Theon-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Singatse-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
213*: Theon-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
220*: Ister-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 69.—BUILDING SITE DEVELOPMENT—Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfill
220*. Devada-----	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, low strength, slope.	Poor: depth to rock, low strength.
221* Iate-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.
Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
Rock outcrop.					
280----- Sagoupe	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness, poor filter.	Severe: flooding, frost action.	Fair: wetness.
281----- Sagoupe	Severe: cutbanks cave.	Severe: flooding.	Severe: wetness, poor filter.	Moderate: flooding, frost action.	Good.
250*: Chalco-----	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock.	Severe: low strength, shrink-swell.	Poor: depth to rock, low strength.
Haar-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: depth to rock, slope.
260*. Iapon-----	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: depth to rock.
Fulstone-----	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: cemented pan.
Clac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock.
275----- Chil.	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: depth to rock.
280----- Perazzo	Severe: cutbanks cave.	Slight-----	Severe: poor filter.	Slight-----	Good.
281----- Perazzo	Severe: cutbanks cave.	Moderate: slope.	Severe: poor filter.	Moderate: slope.	Good.
290----- Springmeyer variant	Moderate: wetness.	Severe: flooding.	Severe: percs slowly.	Severe: low strength.	Fair: shrink-swell.

See footnote at end of table.

TABLE 69.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Well logs without basements	Septic tank absorption fields	Local roads and streets	Roadfill
313*: Risley-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength.
Rubble land.					
Devada-----	Severe: depth to rock	Severe: shrink-swell, depth to rock.	Severe: depth to rock.	Severe: depth to rock, low strength.	Poor: depth to rock, low strength.
314*: Risley-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength.
Xman-----	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength.
Rock outcrop.					
350----- Hunewill	Severe: cutbanks cave.	Moderate: large stones.	Severe: poor filter.	Moderate: frost action, large stones.	Poor: large stones.
351----- Hunewill	Severe: cutbanks cave.	Moderate: slope, large stones.	Severe: poor filter.	Moderate: slope, frost action, large stones.	Fair: large stones.
381----- veta	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: frost action, large stones.	Fair: large stones.
480*: Olac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: slope.
Bombadil-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock.
Rock outcrop.					
483*: Olac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: slope.
Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
Rock outcrop.					
484*: Olac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: slope.

See footnote at end of table.

TABLE 69.—BUILDING SITE DEVELOPMENT—Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfill
484*: Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
Ister-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.
485* Clac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: slope.
Chalco-----	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.
Maar-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: depth to rock, slope.
487*: Clac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: slope.
Cagle-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.
Oppia-----	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope, shrink-swell.	Poor: depth to rock, shrink-swell.
488*: Clac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock.
Rubble land.					
Indiana-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.
489*: Clac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: slope.
Emillcone-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: depth to rock, slope.
Old Camp-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.

See footnote at end of table.

TABLE 69.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfill
549*: Womer-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones.
Zephani-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.
Olac-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: slope.
553: Pulstone-----	Severe: cemented pan, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: cemented, ar, slope.	Poor: cemented pan.
554*, Pulstone-----	Severe: cemented pan, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Poor: cemented pan.
Keno-----	Severe: cemented pan.	Severe: shrink-swell.	Severe: cemented pan, percs slowly.	Severe: low strength, shrink-swell.	Poor: cemented pan.
571: Ackley-----	Slight-----	Moderate: shrink-swell.	Moderate: percs slowly.	Moderate: frost action, shrink-swell.	Good.
574*: Ackley-----	Slight-----	Moderate: shrink-swell.	Moderate: percs slowly.	Moderate: frost action, shrink-swell.	Good.
Veta-----	Severe: culbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: frost action, large stones.	Fair: large stones.
602*, Pit's Dumps.					
875*: Xman-----	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.
Zephani-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.
Mizel-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
876*: Xman-----	Severe: depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.

See footnote at end of table.

TABLE 69.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfill
876*: Oppio-----	Severe depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope, shrink-swell.	Poor: depth to rock, slope, shrink-swell.
Old Camp-----	Severe depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Poor: depth to rock, large stones, slope.
877*: Xman-----	Severe depth to rock, slope.	Severe: shrink-swell, slope.	Severe: depth to rock, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.
Duco-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
893*: Ind,ato-----	Severe depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock.
Duco-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Cagle-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength.
894*: Ind,ato-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.
Devada-----	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock.	Severe: depth to rock, low strength.	Poor: depth to rock, low strength.
1010*: Tagura-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock.
Indiana-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.
Oppio-----	Severe depth to rock.	Severe: shrink-swell.	Severe: depth to rock.	Severe: low strength, shrink-swell.	Poor: depth to rock, low strength.
1030*: Xerta-----	Severe: depth to rock.	Severe: shrink-swell.	Severe: depth to rock, cemented pan.	Severe: low strength, shrink-swell.	Poor: depth to rock, low strength.

See footnote at end of table.

TABLE 69.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfill
1030*. Devada-----	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock.	Severe: depth to rock, low strength.	Poor: depth to rock, low strength.
Ister-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, percs slowly, slope.	Severe: slope.	Poor: depth to rock, slope.
1410*: Luttrell-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Gallatin-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock.
1511*. Cagle-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength, slope.
Nostrad-----	Severe: slope.	Severe: slope.	Severe: percs slowly, slope.	Severe: slope.	Poor: slope.
1520*. Ducco-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Smallcone-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: depth to rock, slope.
Cagle-----	Severe: slope.	Severe: shrink-swell, slope.	Severe: depth to rock, percs slowly, slope.	Severe: low strength, slope, shrink-swell.	Poor: depth to rock, low strength.
1521*. Ducco-----	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, large stones.
Springmeyer-----	Moderate: slope.	Moderate: shrink-swell, slope.	Severe: percs slowly.	Moderate: slope, frost action, shrink-swell.	Fair: shrink-swell.
1530* Manoque-----	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: percs slowly.	Severe: low strength, shrink-swell.	Poor: low strength, shrink-swell.
Devada-----	Severe: depth to rock.	Severe: shrink-swell, depth to rock.	Severe: depth to rock.	Severe: depth to rock, low strength.	Poor: depth to rock, low strength.
Rock outcrop.					

See footnote at end of table.

TABLE 69.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Septic tank absorption fields	Local roads and streets	Roadfill
1531*: Manogue-----	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: percs slowly.	Severe: low strength, shrink-swell.	Poor: low strength, shrink-swell.
Springmeyer-----	Moderate: slope.	Moderate: shrink-swell, slope.	Severe: percs slowly.	Moderate: slope, frost action, shrink-swell.	Fair: shrink-swell.
1543----- Manogue	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: percs slowly.	Severe: low strength, shrink-swell.	Poor: low strength, shrink-swell.
1534*: Manogue-----	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: percs slowly.	Severe: low strength, shrink-swell.	Poor: low strength, shrink-swell.
Hafed-----	Severe: cutbanks cave, slope.	Severe: slope.	Severe: poor filter, slope.	Severe: slope.	Poor: slope.
Rock outcrop.					
1535----- Manogue	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: percs slowly.	Severe: low strength, shrink-swell.	Poor: low strength, shrink-swell.

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 70.--ENGINEERING INDEX PROPERTIES

The symbol < means less than > means more than. Absence of an entry indicates that data were not estimated.

Soil name and map symbol	Depth	USLA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit, %	Plasticity index
			Limited	AASHTO		4	10	40	200		
	In				Pct					Pct	
021*: Bombadil-----	0-4	Stony loam	GM	A-4	10-30	75-80	60-75	50-65	35-50	15-25	NP-5
	2-10	Loam, gravelly loam.	CL, CL	A-4, A-6	0-10	75-100	70-90	65-85	60-70	25-35	5-15
	10-20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Indiano-----	0-13	Gravelly loam	M, SM-GC, ML, CL-ML	A-4	0-5	60-80	60-75	50-70	35-60	20-30	NP-10
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-65	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
05.* Old Camp-----	0-2	Very stony loam	GM, GM-GC, SM, SM-SC	A-2, A-4	25-55	60-70	55-65	45-55	30-40	15-25	NP-10
	2-14	Very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	15-50	40-55	35-50	30-45	25-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Refed-----	0-2	Very stony sandy loam.	SM-SC	A-2	30-45	40-85	60-70	40-55	20-35	20-30	5-10
	2-14	Very gravelly sandy loam, very gravelly loam.	GC	A-2	5-10	50-65	35-55	25-50	10-35	25-35	10-15
	14-72	Stratified very gravelly loamy sand to very cobbly sandy loam.	SM	A-1, A-2	15-40	75-85	50-75	30-60	15-35	---	NP
Rock outcrop.											
052*: Old Camp-----	0-2	Extremely stony loam.	GM, GM-GC, SM, SM-SC	A-2, A-4	25-55	60-70	55-65	45-55	30-40	15-25	NP-10
	2-14	Very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	35-50	40-55	35-50	30-45	25-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rubble land.											
Rock outcrop.											

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	<u>In</u>				<u>Pct</u>					<u>Pct</u>	
054* Old Camp-----	0-2	very cobbly loam	GM, GM-GC, SM, SM-SC	A-2, A-4	25-55	60-70	55-65	45-55	30-40	15-25	NP-10
	2-14	Very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	35-50	40-55	35-50	30-45	25-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Olac-----	0-3	Extremely cobbly loam.	GM-GC, GM	A-1, A-2	45-65	30-40	25-35	20-30	15-25	20-30	NP-10
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	30-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Indiana-----	0-13	Stony fine sandy loam.	SM	A-2, A-4	20-25	70-85	65-80	50-70	30-50	15-25	NP-5
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
060* Cleaver-----	0-1	Very gravelly sandy loam.	GM	A-1	0-10	35-50	25-40	20-30	10-20	---	NP
	1-11	Gravelly clay loam, gravelly loam.	SC, CL	A-6, A-7	0-5	75-85	50-75	45-70	40-60	35-50	15-25
	11-20	Indurated-----	---	---	---	---	---	---	---	---	---
	20-60	Stratified very gravelly sandy loam to extremely gravelly coarse sand.	GP, GF-GM	A-1	30-25	15-30	10-25	5-15	0-10	---	NP
Stingdom-----	0-5	Very cobbly loam	SM-SC	A-2, A-4	30-50	70-85	55-70	40-55	30-40	20-30	5-10
	5-14	very cobbly clay loam.	GC	A-6	30-50	60-75	50-65	45-60	35-50	35-40	15-20
	14-15	Indurated-----	---	---	---	---	---	---	---	---	---
	15-19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
062* Cleaver-----	0-3	Very gravelly sandy loam.	GM	A-1	0-10	35-50	25-40	20-30	10-20	---	NP
	3-11	Gravelly clay loam, gravelly loam.	SC, CL	A-6, A-7	0-5	75-85	50-75	45-70	40-60	35-50	15-25
	11-46	Indurated-----	---	---	---	---	---	---	---	---	---
	46-60	Stratified very gravelly sandy loam to extremely gravelly coarse sand.	GP, GF-GM	A-1	30-25	15-30	10-25	5-15	0-10	---	NP

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth in	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
062* veta-----	0-6	Very gravelly sandy loam.	GM	A-1	0-5	40-55	35-50	20-35	10-20	---	NP
	6-18	Extremely gravelly loam, very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	10-30	40-55	30-50	20-40	15-30	---	NP
	18-60	Stratified extremely gravelly loamy sand to very gravelly loam.	GP-GM, GM	A-2	10-25	30-55	20-50	15-35	5-20	---	NP
080* Wedekind-----	0-7	Gravelly loam	SM	A-2, A-4	0-5	75-85	50-65	40-60	30-50	15-25	NP-5
	7-13	Sandy clay loam, clay loam, gravelly sandy clay loam.	SC	A-2, A-6	0-5	80-90	55-90	45-70	20-50	30-40	10-20
	13-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Xman-----	0-2	Very stony loam	SM	A-2, A-4	0-5	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	60-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Inuano-----	0-13	Stony sandy loam	SM	A-2, A-4	0-5	70-85	65-80	40-65	20-35	---	NP
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SL, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
120* Spitznagel-----	0-6	Gravelly loam	SM, SM-SC	A-2, A-4	0-5	65-80	55-75	45-60	25-40	20-30	NP-10
	6-60	Gravelly sandy clay loam, sandy clay loam, clay loam.	SL, CL	A-2, A-6, A-7	0-5	60-95	65-85	60-80	30-60	35-45	15-20
Reno-----	0-3	Cobbly fine sandy loam.	SM	A-1, A-2	15-30	75-95	65-90	45-65	20-30	15-25	NP-5
	3-32	Clay, sandy clay, gravelly clay.	SC, CF, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-65	25-35
	32-44	Indurated	---	---	---	---	---	---	---	---	---
	44-60	Very gravelly loamy sand, extremely gravelly loamy sand.	GP-GM, GM	A-1	5-10	30-55	20-50	15-30	5-15	---	NP
135* Oppio-----	0-6	Very stony fine sandy loam.	SM	A-2, A-4	25-35	65-75	45-65	35-50	20-30	10-20	NP-5
	6-27	Gravelly clay	GC	A-7	0-5	60-70	50-60	45-55	40-50	50-60	20-30
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit, Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	60		
	In				Pct						
135*: Nusrac-----	0-6	Stony fine sandy loam.	SM-SC	A-2	5-20	60-70	55-65	45-55	15-25	20-25	5-10
	6-62	Very gravelly clay loam, very gravelly loam.	GC	A-2	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	52-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-45	30-50	25-45	20-40	30-35	10-15
137A: Opp.-----	0-2	Very stony loam	SM	A-2, A-4	5-35	65-75	65-65	40-55	30-45	20-30	MF-5
	2-26	Gravelly clay	GC	A-7	0-5	60-70	50-60	45-55	40-50	50-60	20-30
	26-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Reywat-----	0-5	Stony loam	GM, SM	A-4	25-55	55-80	50-70	45-65	35-50	25-35	ST-10
	5-15	Very gravelly clay loam, very gravelly loam, very gravelly sandy clay loam.	GC	A-2, A-6	10-20	40-60	35-55	35-45	25-40	30-40	10-20
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ind.ano-----	0-13	Stony, sandy loam	SM	A-1, A-4	20-25	70-85	65-80	40-65	20-35	---	SP
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
150*: Tristan-----	0-7	Very stony loam	SM-GC	A-2, A-4	30-50	55-70	50-65	35-55	30-50	20-30	5-20
	7-28	Very stony loam, very cobbly clay loam, very gravelly clay loam.	GC, SC, CL	A-2, A-6	30-50	40-80	35-70	30-60	25-50	25-40	10-20
	28-49	Extremely cobbly loam, extremely cobbly sandy clay loam.	GC	A-2	55-75	40-50	35-45	10-40	10-25	25-35	10-15
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Duco-----	0-5	Extremely stony loam.	SM-SC, GM-GC	A-2, A-4	35-55	55-80	50-75	35-60	25-50	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly sandy clay loam.	GC	A-2	15-55	35-65	30-55	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth, ft	USDA texture	Classification		Fracture, %	Percentage passing sieve number				Liquid limit, %	Plasticity index
			Unified	AASHTO		4	10	40	200		
150*: Zephaniah	0-8	Extremely cobbly loam.	GM	A-1, A-2	40-45	30-60	20-40	5-40	10-30	20-25	NP-5
	8-15	Very cobbly clay, (C, Cl)	GC	A-6	30-40	65-80	50-70	50-70	30-50	50-60	25-35
	15-35	Very cobbly sandy clay, very cobbly clay loam.	GC	A-6	30-40	65-80	50-70	50-70	30-50	50-60	25-35
	35-42	Weathered bedrock.	---	---	---	---	---	---	---	---	---
151*: Tristram	0-9	Very stony loam	GM-SC	A-2, A-6	30-50	55-75	45-65	15-45	10-35	20-30	5-10
	9-36	Very stony loam, very cobbly clay loam, very gravelly clay loam.	GM, SC, Cl	A-2, A-6	30-50	55-75	45-65	15-45	10-35	25-40	10-20
	36-54	Extremely cobbly loam, extremely cobbly sandy clay loam.	GC	A-2	55-75	40-50	35-45	15-40	10-35	25-35	10-15
	54-58	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Humboldt	0-10	Very gravelly loam.	SC, SM-SC	A-6	5-10	55-75	45-65	15-45	10-35	20-35	5-15
	10-20	Very gravelly loam, very gravelly clay loam.	SC	A-2	15-25	55-65	45-55	15-35	10-30	25-40	10-20
Gabriel	0-5	Cobbly loam.	GM	A-6	30-50	50-70	45-65	15-50	10-35	25-35	NP-5
	5-19	Very gravelly loam, very gravelly silty clay loam, very stony clay loam.	GC	A-2, A-6	30-50	55-75	45-65	15-50	10-40	25-35	NP-2
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
77A Nevada	0-4	Very cobbly loam	GM, SC-SC	A-2, A-6	30-65	55-75	50-70	40-50	10-45	25-35	5-15
	4-13	Gravelly clay, clay.	GM, SC	A-6	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
61A Nevada	0-4	Very stony loam	SM-SC, SC	A-4, A-6	15-60	95-100	10-100	60-75	45-60	25-35	5-15
	4-13	Gravelly clay, clay.	GM, SC	A-2	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth  in	USDA texture	Classification		Frag- ments > 3 inches  Pct	Percentage passing sieve number--				Liquid limit  Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
161*: Noszac-----	0-8	Extremely stony loam.	SC, CL	A-6	30-40	80-90	70-80	60-70	45-55	30-35	10-15
	8-27	Very gravelly clay loam, very cobble clay loam.	GC	A-1	5-60	40-50	30-40	30-40	20-30	40-45	15-20
	27-60	very gravelly clay loam.	GC	A-2	5-10	50-60	40-50	35-45	25-35	40-45	15-20
162*: Devada-----	0-4	Very stony loam	SM-SC, SC, CL-ML, CL	A-4, A-6	25-60	95-100	90-100	60-75	45-60	25-35	5-15
	4-13	Gravelly clay, clay.	Ch, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
ulac-----	0-3	Very stony sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	30-55	55-75	50-70	35-55	15-35	20-30	NP-10
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	30-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Old Camp-----	0-2	Extremely stony loam.	GM, GM-GC, SM, SM-SC	A-2, A-4	25-55	60-70	55-65	45-55	30-40	15-25	NP-10
	2-14	Very cobble clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	35-50	40-55	35-50	30-45	25-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
170*: Saralegu-----	0-2	Sand-----	SM, SP-SM	A-1, A-2, A-3	0	95-100	85-95	45-60	5-15	---	NP
	2-34	Sandy loam-----	SM	A-2, A-4	---	95-100	95-100	60-70	30-40	20-30	NP-5
	34-60	Gravelly sandy loam, coarse sandy loam.	SM	A-2, A-4, A-1	0	60-100	60-100	35-70	15-40	20-30	NP-5
Isolde-----	0-3	Fine sand-----	SP, SP-SM	A-3	0	100	100	75-90	0-10	---	NP
	3-60	Fine sand, sand	SP, SP-SM	A-3	0	100	100	60-85	0-10	---	NP
180*: Patna-----	0-7	Sand-----	SM	A-2	0	95-100	95-100	60-70	15-25	---	NP
	7-20	Sandy loam, fine sandy loam.	SM-SC	A-4	0	95-100	95-100	65-80	35-50	25-30	5-10
	20-46	Sand, sandy loam	SP-SM, SM	A-2, A-3	0	95-100	95-100	50-60	5-20	---	NP
	46-60	Fine sand, loamy fine sand.	SM	A-2	0	95-100	95-100	60-70	15-35	---	NP
Redland.											

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth in	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
210*- Theop-----	0-2	Very gravelly loam.	GM-GC, GM	A-1, A-2	5-10	40-60	30-50	20-45	15-35	20-30	NP-10
	2-11	Very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam.	GC	A-2	5-15	40-60	30-50	25-40	15-30	30-40	10-20
	11-16	Weathered bedrock	---	---	---	---	---	---	---	---	---
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lapon-----	0-3	Very stony loam	GM-GC, GM	A-2	15-40	50-60	35-50	30-40	20-35	25-35	5-10
	3-12	Very gravelly clay loam.	GC	A-2	10-25	40-60	35-55	25-50	20-35	35-40	15-20
	12-13	Indurated-----	---	---	---	---	---	---	---	---	---
	13-17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Olac-----	0-3	Very stony loam	GC	A-2	25-55	40-60	35-55	25-40	20-30	25-35	10-15
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	30-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
211*- Theop-----	0-2	Very stony loam	GM-GC, SM-SC	A-2, A-4	15-55	55-80	45-75	35-50	20-45	20-30	5-10
	2-11	Very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam.	GC	A-2	5-10	40-60	25-50	15-40	10-30	30-40	10-20
	11-16	Weathered bedrock	---	---	---	---	---	---	---	---	---
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Old Camp-----	0-2	Very stony loam	GM, GM-GC, SM, SM-SC	A-2, A-4	25-55	60-70	55-65	45-55	30-40	15-25	NP-10
	2-14	Very obby clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	35-50	40-55	35-50	30-45	25-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
212*- Theop-----	0-2	Very gravelly loam.	GM-GC, GM	A-1, A-2	5-10	40-60	30-50	20-45	15-35	20-30	NP-10
	2-11	Very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam.	GC	A-2	5-15	40-60	30-50	25-40	15-30	30-40	10-20
	11-16	Weathered bedrock	---	---	---	---	---	---	---	---	---
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth, in	USDA texture	Classification		Frag- ments > 3 inches Fet	Percentage passing sieve number--				Liquid limit Fet	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
212* Singatse-----	0-1	Very stony sandy loam.	GM	A-1	25-45	40-60	35-55	20-35	10-20	15-25	NP-5
	1-6	Very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	0-10	35-55	30-50	20-45	10-35	15-25	NP-5
	6-11	Weathered bedrock.	---	---	---	---	---	---	---	---	---
	11	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
213* Thoop-----	0-2	Stony sandy loam	GM-GC	A-2	10-25	45-55	45-55	35-45	20-30	20-25	5-10
	2-10	Very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam.	GC	A-4	5-10	40-60	25-50	15-40	10-30	30-40	10-20
	10-14	Weathered bedrock.	---	---	---	---	---	---	---	---	---
	14-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Old Camp-----	0-2	Very stony loam	SM, GM-GC, SM, SM-SC	A-2, A-4	25-55	60-70	55-65	45-55	30-40	15-25	NP-10
	2-14	Very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	35-50	40-55	35-50	30-45	15-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
220* Isfer-----	0-17	Very stony sandy loam.	GM, SM	A-2, A-4	20-30	60-80	55-75	35-55	25-40	20-30	NP-5
	17-38	Very stony sandy clay loam, very stony clay loam.	GC, SC	A-2, A-6, A-7	35-45	60-85	55-80	40-60	30-50	35-45	5-20
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Devada-----	1-4	Very stony loam	SM-SC, SC, CL-ML, CL	A-4, A-6	25-60	95-100	90-100	60-75	45-60	25-35	5-15
	4-13	Gravelly clay, clay.	CH, GC	A-7	0-5	65-100	55-100	50-90	35-50	40-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
221* Isfer-----	0-17	Very stony sandy loam	GM, SM	A-2, A-4	20-30	60-80	55-75	35-55	25-40	20-30	NP-5
	17-38	Very stony sandy clay loam, very stony clay loam.	GC, SC	A-2, A-6, A-7	35-45	60-85	55-80	40-60	30-50	35-45	15-20
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Old Camp-----	0-2	Very stony loam	GM, GM-GC, SM, SM-SC	A-2, A-4	25-55	60-70	55-65	45-55	30-40	15-25	NP-10
	2-14	Very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	35-50	40-55	35-50	30-45	15-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.



TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth In	USDA texture	Classification		F-ag ber'ts > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
221*: Rock outcrop.											
230----- Sagoupe	0-22	Sandy loam	SM	A-4	0	100	35-50	55-75	25-35	---	NI
	22-60	Sand, loamy sand	SP-SM, SM	A-1, A-2, A-3	0	90-100	80-95	55-65	5-25	---	NP
231----- Sagoupe	0-21	Sandy loam	SM, ML	A-4	0	100	100	70-85	40-55	---	NP
	21-60	Stratified coarse sand to silt loam.	SM	A-2, A-4	0	100	100	50-75	15-40	---	NP
250*: Chalco	0-5	Very cobbly loam	SM-SC, SC	A-4, A-6	30-45	70-80	60-70	50-60	40-50	25-35	5-15
	5-14	Clay, silty clay	CH	A-7	0-5	60-100	75-100	70-90	15-35	50-65	25-35
	14-18	Weathered bedrock	---	---	---	---	---	---	---	---	---
252----- Chalco	0-4	Loam	CL-ML	A-4	0-15	80-100	75-100	65-90	50-70	20-30	5-10
	4	Weathered bedrock	---	---	---	---	---	---	---	---	---
260*: Lapon	0-2	Very stony loam	GM-GC, GM	A-4	15-40	50-60	35-50	30-40	20-35	25-35	5-10
	2-10	Very gravelly clay loam.	GC	A-2	10-25	60-60	35-55	25-35	20-35	35-40	5-20
	10-20	Indurated	---	---	---	---	---	---	---	---	---
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
261----- Purstone	0-5	Cobbly loam	GM-GC, SM-SC	A-4	15-30	65-80	65-75	60-60	35-50	20-30	5-10
	5-18	Clay	CH, MH	A-7	0-5	95-100	90-100	85-100	70-85	50-65	10-35
	18-35	Indurated	---	---	---	---	---	---	---	---	---
262----- Olac	0-3	Very stony loam	GC	A-2	25-55	40-60	35-55	25-40	20-30	25-30	10-15
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	30-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
275----- Chill	0-5	Coarse sand	SP, SP-SM, SM	A-1	0	80-100	5-100	25-35	0-15	---	NI
	5-14	Gravelly sandy clay loam.	SC	A-2	0	90-100	50-75	40-60	25-35	35-45	15-20
	14-19	Weathered bedrock	---	---	---	---	---	---	---	---	---
280----- Pezazzo	0-4	Very gravelly sandy loam.	GM	A-1	0-10	40-60	35-50	25-35	10-20	10-30	NP-5
	4-13	Very gravelly sandy clay loam, very gravelly clay loam.	GC	A-2	0-5	40-60	35-50	30-40	20-35	30-40	10-15
	13-21	Extremely gravelly sandy loam, extremely gravelly loam.	GP-GM, GM	A-1	0-5	20-30	15-25	10-20	5-15	---	NP
	21-60	Extremely gravelly sand, extremely gravelly loamy sand.	GP-GM, GP	A-1	0-5	20-30	15-25	10-20	0-10	---	NP

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3 inches or less	Percentage passing sieve number				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	<u>in</u>										
281----- Petassoo	0-2	Very stony sandy loam.	GM	A-1	20-30	40-55	35-50	20-35	10-20	20-30	NP-5
	2-13	Very gravelly sandy clay loam, very gravelly clay loam.	GC	A-2	0-5	40-60	35-50	30-40	20-35	30-40	10-15
	13-34	Extremely gravelly sandy loam, extremely gravelly loam.	GP-GM, GM	A-1	0-5	20-30	15-25	10-20	5-15	---	NP
	34-60	Extremely gravelly sand, extremely gravelly loamy sand.	GP-GM, GP	A-1	0-5	20-30	15-25	10-20	0-10	---	NP
290----- Springmeyer Variant	0-7	loam	CL-ML	A-4	0	95-100	90-100	80-95	60-75	20-30	5-10
	7-47	Silt loam, silty clay loam, clay loam.	CL	A-6	0	95-100	90-100	85-100	60-90	30-40	10-15
	47-60	Silt loam, loam	CL-ML	A-4	0	90-100	85-100	80-100	60-90	20-30	5-10
313*: Rusley-----	0-6	Extremely stony loam.	SC, CL, CL-ML, SM-SC	A-4, A-6	40-60	75-90	70-85	60-80	45-65	25-35	5-15
	6-28 28	Clay, clay loam Weathered bedrock	CH, CL ---	A-7 ---	0-5 ---	85-100 ---	85-100 ---	75-100 ---	60-95 ---	40-55 ---	20-30 ---
Rubble land.											
Devau-----	0-4	Extremely cobbly loam.	GM-GC, GC	A-2	45-55	25-40	20-35	15-30	10-20	25-35	5-15
	4-13	Gravelly clay, clay.	CH, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
314*: Risley-----	0-3	Very stony loam	SC, CL, CL-ML, SM-SC	A-4, A-6	25-40	75-90	70-85	60-80	45-65	25-35	5-15
	3-23 23-27	Clay, clay loam Weathered bedrock	CH, CL ---	A-7 ---	0-5 ---	85-100 ---	85-100 ---	75-100 ---	60-95 ---	40-55 ---	20-30 ---
Xman-----	0-2	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-95	50-60	30-40
	14-29 29	Weathered bedrock Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth In	USDA texture	Classification		Fragments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
350----- Hunewall	0-3	Gravelly sandy loam.	GM, SM	A-1	0-5	55-80	50-75	30-45	15-25	---	NP
	3-13	very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam.	GC, GM	A-2, A-6	0-15	45-55	40-50	30-45	20-40	35-40	10-15
	13-18	Very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	0-25	45-55	40-50	25-45	15-35	15-25	NP-5
	18-60	Extremely cobbly sand, extremely gravelly sand, extremely cobbly loamy sand.	GP, GP-GM	A-1	15-50	35-45	30-40	10-25	0-10	---	NP
351----- Hunewall	0-5	Very gravelly sandy loam.	GM	A-1	0-10	35-55	30-50	20-35	10-20	---	NP
	5-11	Very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam.	GC, GM	A-2, A-6	0-15	45-55	40-50	30-45	20-40	35-40	10-15
	11-18	very gravelly loam, very gravelly sandy loam.	GM	A-1, A-2	0-25	45-55	40-50	25-45	15-35	15-25	NP-5
	18-60	Extremely cobbly sand, extremely gravelly sand, extremely cobbly loamy sand.	GP, GP-GM	A-1	15-50	35-45	30-40	10-25	0-10	---	NP
381----- Vela	0-6	Very gravelly sandy loam.	GM	A-1	0-25	40-55	35-50	20-45	10-20	---	NP
	6-20	Extremely gravelly loam, very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	10-30	40-55	30-50	20-40	10-30	---	NP
	20-60	Stratified extremely gravelly loamy sand to very gravelly loam.	GP-GM, GM	A-1	10-25	30-55	20-50	15-35	5-20	---	NP
480*; Olac-----	0-3	Very stony sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	30-55	55-75	50-70	35-55	15-35	20-30	NP-10
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	30-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.—ENGINEERING INDEX PROPERTIES—Continued

Soil name and map symbol	Depth, ft	USDA texture	Classification		Percent fines, %	Percentage passing sieve number —				Liquid limit, %	Plasticity index
			Unified	AASHTO		4	10	40	200		
480*: Bambad.1-----	0-3	Stony loam	SM	A-4	10-20	75-80	60-75	50-65	35-50	15-25	NP-5
	3-10	Loam, gravelly loam.	CL-ML, CL	A-4, A-6	0-6	75-100	70-90	65-85	50-70	25-35	5-15
	10-14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
483* LAC-----	0-3	Extremely stony loam.	GC	A-4	15-55	40-60	35-50	25-40	20-30	25-30	10-15
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-4	10-20	30-45	20-35	15-30	10-25	30-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Old Camp-----	0-2	Extremely stony sandy loam.	GM	A-1	25-55	60-70	55-65	35-45	15-25	15-25	NP-5
	2-14	Very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	15-50	40-55	35-50	30-45	25-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
484*: LAC-----	0-3	Very stony sandy loam.	GM, SM-SC, SC	A-4, A-6	15-55	55-75	50-70	35-55	15-35	20-30	NP-10
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-4	10-20	30-45	20-35	15-30	10-25	30-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Old Camp-----	0-2	Very stony loam	GM, SM-SC, SM, SC	A-4, A-6	15-55	60-70	55-65	45-55	30-40	15-25	NP-10
	2-14	Very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	15-50	40-55	35-50	30-45	25-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ister-----	0-7	Very stony sandy loam.	GM, M	A-4, A-6	20-30	60-80	55-75	35-55	25-40	20-30	NP-5
	7-25	Very stony sandy clay loam, very stony clay loam.	GC, SC	A-2, A-6, A-7	35-45	60-85	55-80	40-60	30-50	35-45	15-20
	25-29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth in	USLA texture	Classification		Fragments in inches	Percentage passing sieve number				Liquid limit, %	Plasticity index
			Unified	AASHTO		4	10	40	200		
485* Olac-----	0-3 3-10 10	Very stony loam Extremely gravelly clay loam, extremely gravelly loam. Unweathered bedrock.	GC	A-2 A-3	75-85 0-20	40-60 20-45	35-55 20-35	25-40 15-30	20-30 10-25	25-30 30-40	10-15 15-20
Chalco-----	0-3 3-15 15	Very stony loam Silty, sandy clay Weathered bedrock	SM-SC, SC	A-4, A-6 A-7	30-45 0-5	0-80 80-100	60-70 5-10	50-60 70-80	40-50 15-45	25-35 50-65	5-15 25-35
Hagerman-----	0-4 4	Weathered bedrock	CL-ML	A-4	0-10	80-100	75-100	65-90	50-70	20-30	5-10
486* Olac-----	0-5 5-10 10-14	Very stony loam Extremely gravelly clay loam, extremely gravelly loam. Unweathered bedrock.	GC	A-2 A-3	75-85 10-20	40-60 30-45	35-55 20-35	25-40 15-30	20-30 10-25	25-30 30-40	10-15 15-20
Engle-----	0-4 4-24 24	Very stony loam Gravelly clay, gravelly clay loam, gravelly silty clay. Weathered bedrock	CL, SC CL, CL, GC	A-6 A-7	30-50 0-5	55-75 60-85	50-70 50-75	45-60 45-75	35-45 40-55	30-35 45-55	10-15 20-30
Oppie-----	0-6 6-27 27	Extremely stony loam. Gravelly clay Unweathered bedrock.	GM, ML GC	A-4 A-7	45-60 0-5	60-75 60-70	55-60 50-60	40-60 45-55	35-55 40-50	20-30 50-60	NP=5 15-30
488* Olac-----	0-3 3-10 10	Extremely cobbly loam. Extremely gravelly clay loam, extremely gravelly loam. Unweathered bedrock.	GM-GC, GM	A-1, A-2	45-65 10-20	30-40 30-45	25-35 20-35	20-30 15-30	15-25 10-25	20-30 30-40	NP=10 15-20
Rubble land. Indiana-----	0-13 13-33 33	Very stony sandy loam. Clay loam, sandy clay loam, gravelly clay loam. Unweathered bedrock.	SM SC, CL, GC	A-1, A-2 A-2, A-4, A-7	20-25 0-15	70-85 65-95	65-80 60-85	40-65 50-85	20-35 30-70	---	NP 15-25

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth In	LSDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
489* O.R.C.-----	0-3	Very stony sandy loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	30-55	65-75	50-70	35-55	15-35	20-30	NP-10
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	30-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Small cone-----	0-6	Very gravelly coarse sandy loam	GP-GM, GM, SI-SM, SM	A-1	0-10	40-75	25-50	15-35	5-25	20-30	NP-5
	6	Weathered bedrock	---	---	---	---	---	---	---	---	---
Old Camp-----	0-2	Very stony loam	GM, GM-GC, SM, SM-SC	A-2, A-4	25-55	60-70	55-65	45-55	30-40	15-25	NP-10
	2-14	Very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	35-50	40-55	35-50	30-45	25-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
519* Loomer-----	0-4	Extremely cobbly loam.	GM-GC, GC	A-2	40-55	65-55	35-45	30-40	20-35	25-35	5-15
	4-15	Extremely cobbly clay, extremely gravelly clay, extremely cobbly clay loam.	GC	A-2	30-55	30-45	20-35	15-30	15-25	40-55	20-35
	15-19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Zaphen-----	0-8	Extremely cobbly loam.	GM	A-1, A-2	40-45	30-60	20-50	15-40	10-30	20-25	NP-5
	8-35	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	30-40	65-80	60-70	50-70	40-65	50-60	25-35
	35-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Olae-----	0-3	Extremely stony loam.	GC	A-2	25-55	40-60	35-55	25-40	20-30	25-30	10-15
	3-10	Extremely gravelly clay loam, extremely gravelly loam.	GC	A-2	10-20	30-45	20-35	15-30	10-25	30-40	15-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
553 Pulstone-----	0-5	Cobbly loam	GM-GC, SM-SC	A-4	15-30	65-80	65-75	50-60	35-50	20-30	5-10
	5-18	Clay	CH, WH	A-7	0-5	95-100	90-100	85-100	70-85	50-65	20-35
	18-55	Indurated	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth, in	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
554*: Fulstone-----	0-5	Cobbly loam-----	GM-GC, SM-SC	A-4	15-30	65-80	65-75	50-60	35-50	20-30	5-10
	5-18	Clay-----	CH, MH	A-7	0-5	95-100	90-100	85-100	70-85	50-65	20-35
	18-55	Indurated-----	---	---	---	---	---	---	---	---	---
Reno-----	0-7	Cobbly sandy loam	SM	A-1, A-2	15-30	75-95	65-90	45-65	20-30	15-25	NP-5
	7-23	Clay, sandy clay, gravelly clay.	SC, CH, CL	A-7	0-5	80-100	70-95	60-85	45-75	45-65	25-35
	23-50	Indurated-----	---	---	---	---	---	---	---	---	---
571*: Ackley-----	0-3	Gravelly sandy loam.	SM	A-1, A-2	0	65-80	60-75	35-50	20-30	---	NP
	3-27	Sandy loam, loam, sandy clay loam.	CL-ML, ML	A-4	0	85-100	75-100	65-85	50-70	25-35	5-10
	27-60	Fine sandy loam	SM	A-2, A-4	0	85-100	80-100	55-70	25-40	20-30	NP-5
572*: Ackley-----	0-10	Gravelly sandy loam.	SM	A-1, A-2	0	65-80	60-75	35-50	20-30	---	NP
	10-34	Sandy loam, loam, sandy clay loam.	CL-ML, ML	A-4	0	85-100	75-100	65-85	50-70	25-35	5-10
	34-60	Fine sandy loam	SM	A-2, A-4	0	85-100	80-100	55-70	25-40	20-30	NP-5
Verde-----	0-6	Very gravelly sandy loam.	GM	A-1	0-25	40-55	35-50	20-35	10-20	---	NP
	6-18	Extremely gravelly loam, very gravelly sandy loam, very gravelly loam.	GM	A-1, A-2	10-30	40-55	30-50	20-40	10-30	---	NP
	18-60	Stratified extremely gravelly loamy sand to very gravelly loam.	GP-GM, GM	A-1	10-25	30-55	20-50	15-35	5-20	---	NP
602*: Pile, Dumps.											
675*: Xman-----	0-2	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	29	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Zephan-----	0-3	Stony sandy loam	SM-SC	A-2	5-10	65-80	55-65	35-45	15-25	20-30	5-10
	3-31	Very cobbly clay, very cobbly sandy clay, very cobbly clay loam.	GC, CH	A-7	10-40	65-80	60-70	50-70	40-65	50-60	25-35
	31-41	Weathered bedrock	---	---	---	---	---	---	---	---	---
	41-45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Mirel-----	0-8	Very gravelly coarse sandy loam.	GM	A-1	5-10	40-60	30-40	15-30	10-25	15-25	NP-5
	8-12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.—ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth In	USDA texture	Classification		Frag- ments > 3 inches Per	Percentage passing sieve number--				Liqui- d limit P <sub>20</sub>	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
876*											
Xman-----	0-2	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	2-14	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	14-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Oppo-----	0-6	Very stony fine sandy loam.	SM	A-1, A-2	25-35	65-75	45-65	35-50	20-30	10-20	NP-5
	6-27	Gravelly clay----	GC	A-7	0-5	60-70	50-60	45-55	40-50	50-60	20-30
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Old Camp-----	0-2	Extremely stony sandy loam.	SM	A-1	25-55	60-70	55-65	35-45	15-25	45-55	NP-5
	2-14	Very cobbly clay loam, extremely stony sandy clay loam, very stony clay loam.	GC	A-2, A-6	35-50	40-55	35-50	30-45	25-40	30-40	15-25
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
877*											
Xman-----	0-5	Very stony loam	SM	A-2, A-4	20-50	70-85	65-75	45-60	25-50	---	NP
	5-18	Clay, gravelly clay.	CH	A-7	0-10	80-100	70-100	70-95	70-85	50-60	30-40
	18-35	Weathered bedrock.	---	---	---	---	---	---	---	---	---
	35-39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Duco-----	0-5	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly sandy clay loam.	GC	A-2	15-55	35-60	30-55	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
893*											
Indiana-----	0-13	Stony fine sandy loam.	SM	A-2, A-4	20-25	70-85	65-80	50-70	30-50	15-25	NP-5
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-85	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Duco-----	0-5	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly sandy clay loam.	GC	A-2	15-55	35-60	30-55	20-35	15-30	35-40	15-20
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.



TABLE 70.—ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth in	USDA texture	Classification		Frag- ments 3 inches or less	Percentage passing sieve number--				Liqui- d limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
893* Cagle-----	0-4	Very stony clay loam.	CL	A-6, A-7	25-35	85-95	80-90	75-85	55-65	35-45	15-25
	4-24	Gravelly clay, gravelly clay loam, gravelly silty clay.	CL, CH, GC	A-7	0-5	65-85	50-75	45-75	40-65	45-55	20-30
	24	Weathered bedrock.	---	---	---	---	---	---	---	---	---
894* Indiana-----	0-13	Stony sandy loam	SM	A-1, A-2	0-25	70-85	65-80	40-65	30-70	---	NP
	13-26	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-1, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	26-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nevada-----	0-4	Very cobbly loam	GC, GM-GC	A-2, A-4, A-6	30-65	55-75	50-70	40-50	30-40	25-35	5-15
	4-13	Gravelly clay, clay.	SC, SM-SC, CH, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1010* Tahoe-----	0-2	Gravelly loam	SM	A-4	0-10	70-85	60-75	50-70	35-50	15-25	NP-5
	2-19	Gravelly clay loam, gravelly loam.	SC	A-7, A-6	0-10	65-80	50-75	35-60	30-50	30-40	15-20
	19-23	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Indiana-----	0-13	Stony fine sandy loam.	SM	A-2, A-4	20-25	70-85	65-80	50-70	30-50	15-25	NP-5
	13-33	Clay loam, sandy clay loam, gravelly clay loam.	SC, CL, GC	A-2, A-6, A-7	0-15	65-95	60-85	50-85	30-70	30-45	15-25
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Oppio-----	0-3	Very cobbly loam	SM, SM-SC	A-4	30-40	70-85	55-70	45-55	35-50	20-30	NP-10
	3-21	Clay, sandy clay	CH	A-7	0-5	90-100	90-100	75-95	55-70	50-60	30-40
	21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1030* Xerta-----	0-1	Extremely stony clay loam.	GC	A-6, A-7	25-60	60-75	55-65	50-65	35-50	35-50	15-25
	1-25	Clay	CH	A-7	0	90-100	80-90	70-80	60-70	50-60	30-40
	25-29	Indurated	---	---	---	---	---	---	---	---	---
	29-33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nevada-----	0-4	Very stony loam	SM-SC, SC, CL-ML, CL	A-4, A-6	25-60	95-100	90-100	60-75	45-60	25-35	5-15
	4-18	Gravelly clay, clay.	CH, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	18-22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth In	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		#	10	40	200		
1030* Ister-----	0-17	very stony, sandy loam.	GM, SM	A-2, A-4	20-30	60-80	55-75	35-55	25-40	20-30	NP-5
	17-38	very stony sandy clay loam, very stony clay loam.	GC, SC	A-2, A-6, A-7	35-45	60-85	55-80	40-60	30-50	35-45	15-20
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1410*: Burnborough-----	0-19	Very gravelly loam.	SC, SM-SC	A-2	5-10	65-75	40-55	30-45	25-35	20-35	5-15
	19-60	Very gravelly loam, very gravelly clay loam.	GC, SC	A-2	15-25	55-65	35-60	20-35	15-30	25-40	10-20
Gabica-----	0-9	Gravelly loam.	GM	A-4	5-20	50-70	50-70	45-60	35-50	15-25	NP-5
	9-15	Very gravelly clay loam, very gravelly silty clay loam, very stony clay loam.	GC	A-2, A-6	10-50	45-60	25-50	25-50	20-40	25-35	10-20
	15-19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
1511*: Caglo-----	0-4	Extremely stony loam.	GC, SC	A-6	30-50	55-75	50-70	45-60	35-45	30-35	10-15
	4-38	Gravelly clay, gravelly clay loam, gravelly silty clay.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-65	45-55	20-30
	38-42	Weathered bedrock	---	---	---	---	---	---	---	---	---
Norrac-----	0-9	Stony clay loam	GC	A-6	5-20	60-70	55-65	50-60	40-50	30-35	10-15
	9-34	Very gravelly clay loam, very gravelly loam.	GC	A-7	5-25	45-55	40-50	30-45	25-35	35-40	15-20
	34-60	Very gravelly loam, very gravelly fine sandy loam, very gravelly clay loam.	GC	A-2, A-6	10-25	35-55	30-50	25-45	20-40	30-35	10-15
1520* Ducco-----	0-5	Very stony sandy loam.	SM-SC, GM-GC	A-2	25-35	55-80	50-75	35-60	15-35	20-30	5-10
	5-18	very gravelly clay loam, extremely stony clay loam, very cobbly sandy clay loam.	GC	A-2	15-55	35-60	30-55	20-35	15-30	35-40	15-20
	18-22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Smallcone-----	0-6	Very gravelly coarse sandy loam.	GP-GM, GM, SP-SM, SM	A-1	0-10	40-75	25-50	15-35	5-25	20-30	NP-5
	6	weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth In	USDA texture	Classification		Frag- ments > 3 inches Fet	Percentage passing sieve number				Liquid limit Fet	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
1520*: Cagle-----	0-4	Very stony clay loam.	CL	A-6, A-7	25-35	85-95	80-90	75-85	55-65	35-45	15-25
	4-24	Gravelly clay, gravelly clay loam, gravelly silty clay.	CL, CH, GC	A-7	0-5	60-85	50-75	45-75	40-65	45-55	20-30
	24	Weathered bedrock	---	---	---	---	---	---	---	---	---
1521*: Ducc-----	0-5	Very cobbly fine sandy loam.	SM-SC, M-GC	A-2, A-4	35-55	55-80	50-75	35-60	25-50	20-30	5-10
	5-19	Very gravelly clay loam, extremely stony clay loam, very cobbly sandy clay loam.	GC	A-2	15-55	35-60	30-55	20-35	15-30	35-40	15-25
	19	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Springmeyer-----	0-10	Loam-----	SC, CL	A-6	0-5	80-100	60-95	60-80	45-60	25-35	10-15
	10-22	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-95	60-80	30-60	35-45	5-20
	22-60	Stratified extremely gravelly loamy sand to sandy clay loam.	SC	A-2	0-5	70-85	55-70	30-45	20-30	25-35	10-15
1530*: Manogue-----	0-3	Very stony clay	GC, CH, MH	A-7	25-60	60-95	55-90	50-90	45-85	55-65	25-35
	3-41	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	41-63	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	63	Weathered bedrock	---	---	---	---	---	---	---	---	---
Devada-----	0-4	Very stony loam	SM-SC, SC, CL-MH, CL	A-4, A-6	25-60	95-100	90-100	60-75	45-60	25-35	5-15
	4-13	Gravelly clay, clay.	CH, GC	A-7	0-5	65-100	55-100	50-90	35-70	50-65	25-35
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
1531*: Manogue-----	0-3	Cobbly clay-----	CH, MH	A-7	25-30	70-85	70-80	60-75	50-70	55-65	25-35
	3-41	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	41-63	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	63	Weathered bedrock	---	---	---	---	---	---	---	---	---
Springmeyer-----	0-16	Stony loam-----	SC, CL, SM-SC, CL-MH	A-6, A-4	5-20	80-100	75-95	55-75	35-60	25-35	5-15
	16-46	Gravelly sandy clay loam, sandy clay loam, clay loam.	SC, CL	A-2, A-6, A-7	0-5	80-95	65-85	60-80	30-60	35-45	15-20
	46-60	Stratified very gravelly sandy clay loam to loamy sand.	SC	A-2	6-10	70-85	55-70	35-50	25-35	30-40	10-15

See footnote at end of table.

TABLE 70.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit Pct	Plasticity index
			Unified	AASHTO		4	10	40	100		
	<u>In</u>				<u>Pct</u>						
1533----- Manogue	0-3	Cobb., clay	CH, MH	A-7	25-30	70-85	70-80	60-75	50-70	55-65	25-35
	3-41	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	41-63	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	63	Weathered bedrock	---	---	---	---	---	---	---	---	---
1534*----- Manogue	0-3	Very stony clay	GC, CH, MH	A-7	25-40	60-85	5-90	50-90	45-85	55-65	25-35
	3-41	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	41-63	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	63	Weathered bedrock	---	---	---	---	---	---	---	---	---
Medford-----	0-2	Very stony sandy loam.	SM-SC	A-2	45-45	80-85	60-70	40-55	20-35	20-30	5-10
	2-13	Very gravelly sandy loam, very gravelly loam.	GC	A-2	5-10	50-55	35-55	25-50	10-35	25-35	10-15
	13-75	Stratified very gravelly loamy sand to very cobbly sandy loam.	SM	A-2, A-3	15-40	75-85	50-75	30-60	15-35	---	NP
Rock outcrop.											
1535----- Manogue	0-3	Very stony clay	CH, CH, MH	A-7	25-60	60-95	55-90	50-90	45-85	55-65	25-35
	3-41	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	41-63	Clay, silty clay	CH, MH	A-7	0-5	95-100	90-100	80-100	65-90	55-65	25-35
	63	Weathered bedrock	---	---	---	---	---	---	---	---	---

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 71.—PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

The symbol < means less than, > means more than. Entries for "hydrocarbons" apply to the entire profile. Entries under "wind erod." & "pH" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth ft	Clay Pct	Permeability in/hr	Available water capacity in/in	Soil reaction pH	Calc. rate mghos/cm	Shrinkage potential	Expansion factors		Wind erodibility group
								K	T	
031*: Bombardier	0-2 2-10 10-20	15-15 18-17 ---	0.6-2.0 0.6 ---	0.15-0.17 0.15-0.17 ---	6.6-7.8 6.6-7.8 ---	<2 ---	Low----- Moderate----- ---	0.15 ---	1	6
Ind. And.	0-13 13-13 30	18-20 20-15 ---	0.6-2.0 0.2-0.6 ---	0.12-0.16 0.16-0.19 ---	6.1-7.3 6.1-7.3 ---	<2 ---	Low----- Moderate----- ---	0.32 0.28 ---	2	6
051*: Old Camp	0-2 2-14 14	10-10 10-14 ---	2.0-6.0 0.2-0.6 ---	0.11-0.13 0.08-0.11 ---	6.6-7.8 6.6-9.0 ---	<2 ---	Low----- Low----- ---	0.17 0.15 ---	1	8
Ref.	0-1 1-4 4-12	10-10 10-10 5-10	6.0-20 2.0-6.0 6.0-20	0.03-0.08 0.03-0.11 0.02-0.06	6.6-7.8 6.6-8.4 6.6-8.4	<2 ---	Low----- Moderate----- Low-----	0.10 0.17 ---	5	6
Rock outcrop.										
052*: Old Camp	0-2 2-14 14	10-20 20-35 ---	2.0-6.0 0.2-0.6 ---	0.11-0.13 0.08-0.11 ---	6.6-7.8 6.6-9.0 ---	<2 ---	Low----- Low----- ---	0.15 ---		8
Rubble land.										
Rock outcrop.										
054*: Old Camp	0-2 2-14 14	10-20 27-35 ---	2.0-6.0 0.2-0.6 ---	0.11-0.13 0.08-0.11 ---	6.6-7.8 6.6-9.0 ---	<2 ---	Low----- Low----- ---	0.17 0.15 ---	1	8
Di.	0-3 3-10 10	10-10 10-10 ---	0.6-2.0 0.6-2.0 ---	0.04-0.07 0.05-0.07 ---	6.1-7.8 6.1-7.8 ---	<2 ---	Low----- Low----- ---	0.05 0.05 ---	1	8
Indiana	0-13 13-33 33	5-15 20-35 ---	2.0-6.0 0.2-0.6 ---	0.11-0.12 0.1-0.11 ---	6.1-7.3 6.1-7.3 ---	<2 ---	Low----- Moderate----- ---	0.15 0.18 ---		4
060*: Cave	0-1 1-11 11-20 20-60	5-15 15-35 5-10 ---	2.0-6.0 0.06-0.2 2.0-6.0 ---	0.05-0.07 0.11-0.16 0.03-0.05 ---	6.6-9.0 6.6-8.4 6.6-9.0 ---	<2 ---	Low----- Moderate----- Low----- ---	0.1 0.10 0.05 ---	1	5
Shingdorn	0-5 5-14 14-15 15-19	12-20 27-35 ---	0.6-2.0 0.2-0.6 ---	0.10-0.12 0.10-0.13 ---	7.4-8.0 7.4-9.0 ---	<2 ---	Low----- Low----- ---	0.10 ---	1	7
062*: Cave	0-3 3-11 11-46 46-60	5-12 25-35 ---	2.0-6.0 0.06-0.2 2.0-6.0 ---	0.05-0.07 0.12-0.16 0.03-0.05 ---	6.6-9.0 6.6-8.4 6.6-9.0 ---	<2 ---	Low----- Moderate----- Low----- ---	0.1 0.10 0.05 ---		5

See footnote at end of table.

TABLE 71.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
	In	Pct	In/hr	In/in	pH	mehos/cm				
062*:										
Veta-----	0-6	5-15	2.0-6.0	0.04-0.08	6.6-8.4	<2	Low-----	0.10	5	5
	6-18	5-15	2.0-6.0	0.04-0.08	6.6-8.4	<2	Low-----	0.10		
	18-60	2-15	2.0-6.0	0.04-0.08	6.6-8.4	<2	Low-----	0.10		
080*:										
Wedekind-----	0-2	10-25	2.0-6.0	0.13-0.16	6.1-7.3	<2	Low-----	0.24	1	4
	2-13	22-32	0.2-0.6	0.15-0.20	6.1-7.3	<2	Moderate-----	0.20		
	13-60	---	---	---	---	---	---	---		
Xman-----	0-2	12-18	2.0-6.0	0.10-0.13	6.1-7.3	<2	Low-----	0.32	1	5
	2-4	40-50	0.06-0.2	0.14-0.16	6.1-7.8	<2	High-----	0.24		
	4-29	---	---	---	---	---	---	---		
	29	---	---	---	---	---	---	---		
Indiana-----	0-13	5-15	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low-----	0.32	2	4
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate-----	0.28		
	33	---	---	---	---	---	---	---		
120*:										
Sprague-----	0-6	10-20	0.2-2.0	0.12-0.14	6.1-7.3	<2	Moderate-----	0.32	5	5
	6-60	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate-----	0.20		
Reno-----	0-3	5-15	2.0-6.0	0.08-0.12	6.1-7.3	<2	Low-----	0.17	2	4
	3-42	25-40	<0.06	0.14-0.16	6.1-7.8	<2	High-----	0.24		
	32-44	---	---	---	---	---	---	---		
	44-60	3-8	>6.0	0.05-0.07	7.4-8.4	<4	Low-----	0.15		
135*:										
Oppelo-----	0-6	6-18	2.0-6.0	0.07-0.09	7.4-7.8	<2	Low-----	0.28	2	8
	6-27	18-35	0.06-0.2	0.14-0.16	7.4-7.8	<2	High-----	0.17		
	27	---	---	---	---	---	---	---		
Bostrac-----	0-6	10-15	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low-----	0.24	5	8
	6-52	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low-----	0.15		
	52-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate-----	0.10		
137*:										
Opkalo-----	0-2	10-15	2.0-6.0	0.08-0.10	7.4-7.8	<2	Low-----	0.28	2	8
	2-26	40-50	0.06-0.2	0.14-0.16	7.4-7.8	<2	High-----	0.17		
	26-5	---	---	---	---	---	---	---		
Keywat-----	0-5	10-18	0.6-2.0	0.10-0.13	6.6-7.8	<2	Low-----	0.17	1	8
	5-15	24-35	0.2-0.6	0.10-0.12	6.6-8.4	<2	Moderate-----	0.15		
	15	---	---	---	---	---	---	---		
Indiana-----	0-13	5-15	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low-----	0.32	2	4
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate-----	0.28		
	33	---	---	---	---	---	---	---		
150*:										
Tristan-----	0-7	10-20	0.6-2.0	0.07-0.08	6.6-7.8	<2	Low-----	0.28	3	8
	7-28	18-35	0.2-0.6	0.06-0.10	6.6-7.8	<2	Moderate-----	0.14		
	28-49	18-27	0.2-0.6	0.04-0.06	6.6-7.8	<2	Moderate-----	0.10		
	49	---	---	---	---	---	---	---		
Duco-----	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low-----	0.15	1	8
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate-----	0.10		
	19	---	---	---	---	---	---	---		
Zephan-----	0-8	10-15	0.6-2.0	0.11-0.13	5.6-7.3	<2	Low-----	0.10	2	8
	8-35	35-45	0.06-0.2	0.10-0.13	5.6-7.3	<2	High-----	0.10		
	35-42	---	---	---	---	---	---	---		
	42	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 71.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth		Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
	In	Feet	In/hr	In/in	pH	mmhos/cm		K	T	
151*:										
Tristan-----	0-4	0-20	0.6-2.0	0.07-0.08	6.6-7.8	<2	Low-----	0.28	3	8
	9-36	18-35	0.2-0.6	0.06-0.10	6.6-7.8	<2	Moderate-----	0.24		
	36-54	18-27	0.2-0.6	0.04-0.06	6.6-7.8	<2	Moderate-----	0.10		
	54-58	---	---	---	---	---	---	---		
Burnborough-----	0-17	10-25	0.6-6.0	0.10-0.13	6.1-7.3	<2	Moderate-----	0.24	5	7
	17-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate-----	0.15		
Lab, a-----	0-5	10-15	0.6-2.0	0.10-0.12	5.6-7.3	<2	Low-----	0.24	1	8
	5-19	24-35	0.2-0.6	0.05-0.09	5.6-7.3	<2	Low-----	0.15		
	19	---	---	---	---	---	---	---		
160*:										
Devada-----	0-4	15-27	0.6-2.0	0.07-0.09	6.1-7.3	<2	Moderate-----	0.15	1	8
	4-13	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High-----	0.17		
	13	---	---	---	---	---	---	---		
Rock outcrop.										
161*:										
Devada-----	0-4	15-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Moderate-----	0.17	1	8
	4-13	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High-----	0.17		
	13	---	---	---	---	---	---	---		
Nosrac-----	0-8	20-25	0.6-2.0	0.12-0.14	6.6-7.3	<2	Moderate-----	0.28	5	8
	8-27	30-35	0.2-0.6	0.08-0.09	6.6-7.3	<2	Moderate-----	0.24		
	27-60	30-35	0.2-0.6	0.11-0.13	6.6-7.3	<2	Moderate-----	0.28		
162*:										
Devada-----	0-4	15-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Moderate-----	0.17	1	8
	4-13	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High-----	0.17		
	13	---	---	---	---	---	---	---		
Olac-----	0-3	10-20	2.0-6	0.05-0.07	6.1-7.8	<2	Low-----	0.10	1	5
	3-10	23-30	0.6-2.0	0.05-0.07	6.1-7.8	<2	Low-----	0.05		
	10	---	---	---	---	---	---	---		
Old Camp-----	0-2	10-20	2.0-6.0	0.11-0.13	6.6-7.8	<2	Low-----	0.17	1	8
	2-14	27-35	0.2-0.6	0.08-0.11	6.6-9.0	<2	Moderate-----	0.24		
	14	---	---	---	---	---	---	---		
170*:										
Sarsalegui-----	0-2	1-5	6.0-20	0.05-0.07	5.6-6.5	<2	Low-----	0.10	5	1
	2-32	8-18	2.0-6.0	0.12-0.13	6.6-7.8	<2	Low-----	0.20		
	32-60	8-12	2.0-6.0	0.07-0.12	6.6-7.8	<2	Low-----	0.17		
Isolde-----	0-3	0-5	>20	0.06-0.09	6.6-8.4	<2	Low-----	0.28	5	1
	3-60	0-5	>20	0.06-0.09	6.6-8.4	<2	Low-----	0.24		
180*:										
Patna-----	0-7	3-10	>6.0	0.07-0.09	6.6-7.8	<2	Low-----	0.15	5	1
	7-20	1-16	2.0-6.0	0.11-0.13	6.6-7.8	<2	Low-----	0.24		
	20-46	0-5	>6.0	0.07-0.09	7.4-8.4	<2	Low-----	0.15		
	46-60	0-5	>6.0	0.07-0.10	7.4-8.4	<2	Low-----	0.15		
Badland										
210*:										
Theon-----	0-4	10-20	2.0-6.0	0.06-0.09	6.6-8.4	<2	Low-----	0.05	1	8
	2-11	25-35	0.2-0.6	0.06-0.09	6.6-9.0	<2	Low-----	0.15		
	11-16	---	---	---	---	---	---	---		
	16	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 71.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth in	Clay Pct	Permeability in/hr	Available water capacity in <sup>3</sup> /in	Soil reaction pH	Salinity mmhos/cm	Shrink-swell potential	Erosion factors		Wind erodibility group
								K	T	
210* Lagon	0-3 3-12 12-13 13-17	15-25 20-35 --- ---	0.6-2.0 0.06-0.2 --- ---	0.11-0.14 0.12-0.14 --- ---	6.6-7.6 6.6-9.0 --- ---	<2 <4 --- ---	Low Low --- ---	0.17 0.10 --- ---	1	7
Olar	0-3 3-10 10	15-23 23-30 ---	0.6-2.0 0.6-2.0 ---	0.07-0.09 0.05-0.07 ---	6.1-7.8 6.1-7.8 ---	<2 <2 ---	Low Low ---	0.10 0.05 ---	1	8
211* Theon	0-2 2-11 11-16 16	12-20 25-35 --- ---	0.6-6.0 0.2-0.6 --- ---	0.04-0.09 0.06-0.09 --- ---	6.6-8.4 6.6-9.0 --- ---	<2 <2 --- ---	Low Low --- ---	0.05 0.15 --- ---	1	8
Rock outcrop.										
Old Camp	0-2 2-14 14	10-20 27-35 ---	2.0-6.0 0.2-0.6 ---	0.1-0.3 0.08-0.11 ---	6.6-7.8 6.6-9.0 ---	<2 <2 ---	Low Low ---	0.17 0.15 ---	1	8
212* Theon	0-2 2-14 14-16 16	10-20 15-25 --- ---	2.0-6.0 0.2-0.6 --- ---	0.06-0.09 0.06-0.09 --- ---	6.6-8.4 6.6-9.0 --- ---	<2 <2 --- ---	Low Low --- ---	0.05 0.15 --- ---	1	8
Singhke	0-4 4-11 11	5-15 5-15 ---	2.0-6.0 0.2-0.6 ---	0.07-0.09 0.07-0.10 ---	6.6-9.0 7.9-9.0 ---	<2 <2 ---	Low Low ---	0.10 0.10 ---	1	8
213* Theon	0-2 2-10 10-14 14-18	12-18 15-35 --- ---	2.0-6.0 0.2-0.6 --- ---	0.07-0.09 0.06-0.09 --- ---	6.6-8.4 6.6-9.0 --- ---	<2 <2 --- ---	Low Low --- ---	0.17 0.15 --- ---	1	8
Old Camp	0-2 2-14 14	10-20 27-35 ---	2.0-6.0 0.2-0.6 ---	0.11-0.13 0.08-0.11 ---	6.6-7.8 6.6-9.0 ---	<2 <2 ---	Low Low ---	0.17 0.15 ---	1	8
220* Ister	0-17 17-38 38	10-15 25-35 ---	2.0-6.0 0.2-0.6 ---	0.08-0.10 0.09-0.14 ---	6.6-7.8 6.6-7.8 ---	<2 <2 ---	Low Moderate ---	0.10 0.10 ---	2	8
Devada	0-4 4-13 13	15-27 40-60 ---	0.6-2.0 0.06-0.2 ---	0.08-0.10 0.14-0.16 ---	6.1-7.3 6.1-7.3 ---	<2 <2 ---	Moderate High ---	0.17 0.17 ---	1	8
221* Ister	0-17 17-38 38	10-15 25-35 ---	2.0-6.0 0.2-0.6 ---	0.08-0.10 0.09-0.14 ---	6.6-7.8 6.6-7.8 ---	<2 <2 ---	Low Moderate ---	0.10 0.10 ---	2	8
Old Camp	0-2 2-14 14	10-20 27-35 ---	2.0-6.0 0.2-0.6 ---	0.11-0.13 0.08-0.11 ---	6.6-7.8 6.6-9.0 ---	<2 <2 ---	Low Low ---	0.17 0.15 ---	1	8
Rock outcrop.										

See footnote at end of table.



TABLE 71.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth (Clay)		Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
	In	Pct	In/hr	In/ft	pH	mmhos/cm		K	T	
230----- Sagoupe	0-22	5-10	2.0-6.0	0.09-0.13	6.6-9.0	<8	Low-----	0.24	5	3
	22-60	0-4	6.0-20	0.07-0.11	6.6-9.0	<2	Low-----	0.17		
231----- Sagoupe	0-21	5-10	2.0-6.0	0.13-0.15	6.6-8.4	<8	Low-----	0.24	5	3
	21-60	0-5	6.0-20	0.10-0.13	7.8	<4	Low-----	0.20		
250*: Chalco	0-5	15-25	0.6-2.0	0.12-0.15	6.1-7.8	<2	Low-----	0.10	1	7
	5-14	40-60	<0.06	0.12-0.15	6.1-7.8	<2	High-----	0.14		
	14-28	---	---	---	---	---	---	---		
Maar----- 4	0-4	10-18	0.6-2.0	0.16-0.18	6.6-8.4	<2	Low-----	0.43	1	5
	4	---	---	---	---	---	---	---		
260* Lapon-----	0-2	15-25	0.6-2.0	0.11-0.14	6.6-7.8	<2	Low-----	0.10	1	7
	2-10	30-35	0.06-0.1	0.12-0.14	6.6-9.0	<4	Low-----	0.10		
	10-20	---	---	---	---	---	---	---		
	20	---	---	---	---	---	---	---		
Fl. stone-----	0-5	10-20	0.6-2.0	0.09-0.12	6.1-7.3	<2	Low-----	0.28	1	7
	5-18	45-60	0.06-0.2	0.12-0.16	6.6-8.4	<2	High-----	0.17		
	18-55	---	---	---	---	---	---	---		
Clac-----	0-3	15-25	0.6-2.0	0.07-0.09	6.1-7.8	<2	Low-----	0.10	1	8
	3-10	23-30	0.6-2.0	0.05-0.07	6.1-7.8	2	Low-----	0.15		
	10	---	---	---	---	---	---	---		
275----- Ch. l.	0-5	0-5	6.0-20	0.03-0.05	6.6-7.8	<2	Low-----	0.15	1	4
	5-14	15-35	0.2-0.6	0.10-0.13	6.6-7.8	<2	Moderate-----	0.15		
	14-19	---	---	---	---	---	---	---		
280----- Petazzo	0-4	12-18	2.0-6.0	0.05-0.08	6.6-7.8	<2	Low-----	0.05	3	5
	4-13	20-30	0.2-0.6	0.11-0.14	6.6-7.8	<2	Low-----	0.10		
	13-21	2-10	2.0-6.0	0.05-0.07	6.6-7.8	<2	Low-----	0.02		
	21-60	0-4	6.0-20	0.02-0.04	>7.8	<2	Low-----	0.02		
281----- Petazzo	0-4	12-18	2.0-6.0	0.05-0.08	6.6-7.8	<2	Low-----	0.05	3	8
	4-13	20-30	0.2-0.6	0.11-0.14	6.6-7.8	<2	Low-----	0.10		
	13-24	2-10	2.0-6.0	0.05-0.07	6.6-7.8	<2	Low-----	0.02		
	24-60	0-4	6.0-20	0.02-0.04	>7.8	<2	Low-----	0.02		
290----- Spr. Lgmeyer Variant	0-7	12-20	0.6-2.0	0.16-0.18	6.1-7.3	<2	Low-----	0.32	5	5
	7-47	24-30	0.2-0.6	0.18-0.21	6.1-7.3	<2	Moderate-----	0.49		
	47-60	16-26	0.6-2.0	0.16-0.18	7.9-9.0	<4	Moderate-----	0.49		
313* Risley-----	0-6	15-27	0.6-2.0	0.06-0.10	6.1-8.4	<2	Moderate-----	0.10	2	6
	6-28	35-45	0.06-0.2	0.15-0.17	6.1-8.4	<2	High-----	0.32		
	28	---	---	---	---	---	---	---		
Rubble land, Devada-----	0-4	15-27	0.6-2.0	0.04-0.07	6.1-7.3	<2	Low-----	0.10	1	8
	4-13	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High-----	0.17		
	13	---	---	---	---	---	---	---		
314*: Risley	0-3	15-27	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate-----	0.32	2	7
	3-23	35-45	0.06-0.2	0.15-0.17	6.1-8.4	<2	High-----	0.32		
	23-27	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 71.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth		Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	
	In	Pct							K	T		
Xmap-----	0-2	12-18		2.0-6.0	0.10-0.12	6.1-7.3	<2	Low-----	0.32	1	c	
	2-14	40-50		0.06-0.2	0.14-0.16	6.1-7.8	<2	High-----	0.24			
	14-29											
	29											
Rock outcrop.												
350-----	0-3	4-8		2.0-6.0	0.07-0.09	6.6-7.3	<2	Low-----	0.15	2	4	
Hunewill	3-13	25-35		0.2-0.6	0.12-0.15	6.6-7.8	<2	Low-----	0.10			
	13-18	5-15		0.6-2.0	0.08-0.11	6.6-7.8	<2	Low-----	0.15			
	18-60	0-2		6.0-20	0.04-0.05	6.6-7.8	<2	Low-----	0.02			
351-----	0-3	4-8		2.0-6.0	0.06-0.08	6.6-7.3	<2	Low-----	0.10	2	5	
Hunewill	3-11	5-35		0.2-0.6	0.12-0.15	6.6-7.8	<2	Low-----	0.10			
	11-18	5-15		0.6-2.0	0.08-0.11	6.6-7.8	<2	Low-----	0.15			
	18-60	0-2		6.0-20	0.04-0.05	6.6-7.8	<2	Low-----	0.02			
381-----	0-6	5-15		2.0-6.0	0.04-0.08	6.6-7.3	<2	Low-----	0.10	5	8	
Vera	6-20	5-15		2.0-6.0	0.04-0.08	6.6-7.8	<2	Low-----	0.10			
	20-60	2-15		2.0-6.0	0.04-0.08	6.6-8.4	<2	Low-----	0.10			
480*:												
Olac-----	0-3	10-20		2.0-6.0	0.05-0.07	6.1-7.8	<2	Low-----	0.10	1	5	
	3-10	23-30		0.6-2.0	0.05-0.07	6.1-7.8	<2	Low-----	0.05			
	10											
Bombardil-----	0-3	10-15		0.6-2.0	0.11-0.14	6.6-7.8	<2	Low-----	0.32	1	6	
	3-10	18-27		0.2-0.6	0.15-0.17	6.6-7.8	<2	Moderate----	0.32			
	10-14											
Rock outcrop.												
483*:												
Olac-----	0-3	15-22		0.6-2.0	0.07-0.09	6.1-7.8	<2	Low-----	0.10	1	8	
	3-10	23-30		0.6-2.0	0.05-0.07	6.1-7.8	<2	Low-----	0.05			
	10											
Old Camp-----	0-2	5-15		2.0-6.0	0.07-0.09	6.6-7.8	<2	Low-----	0.17	1	8	
	2-14	27-35		0.2-0.6	0.08-0.11	6.6-9.0	<2	Low-----	0.15			
	14											
Rock outcrop.												
484*:												
Olac-----	0-3	10-20		2.0-6.0	0.05-0.07	6.1-7.8	<2	Low-----	0.10	1	5	
	3-10	23-30		0.6-2.0	0.05-0.07	6.1-7.8	<2	Low-----	0.05			
	10											
Old Camp-----	0-2	10-20		2.0-6.0	0.11-0.13	6.6-7.8	<2	Low-----	0.17	1	8	
	2-14	27-35		0.2-0.6	0.08-0.11	6.6-9.0	<2	Low-----	0.15			
	14											
Ister-----	0-7	10-15		2.0-6.0	0.08-0.10	6.6-7.8	<2	Low-----	0.10	2	8	
	7-25	25-35		0.2-0.6	0.09-0.14	6.6-7.6	<2	Moderate----	0.10			
	25-29											
485*:												
Olac-----	0-3	15-22		0.6-2.0	0.07-0.09	6.1-7.8	<2	Low-----	0.10	1	8	
	3-10	23-30		0.6-2.0	0.05-0.07	6.1-7.8	<2	Low-----	0.05			
	10											
Chalco-----	0-3	15-25		0.6-2.0	0.12-0.15	6.1-7.8	<2	Low-----	0.10	1	7	
	3-15	40-60		<0.06	0.12-0.15	6.1-7.8	<2	High-----	0.24			
	15											

See footnote at end of table.

TABLE 71.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth, Clay		Permeability in/hr	Available water capacity in/in	Soil reaction pH	Salinity mmhos/cm	Shrink-swell potential	Proportion factors		Wind erodibility group
	In	Pct						X	T	
Haar-----	0-4 4	10-18	0.6-2.0 ---	0.16-0.18 ---	6.6-8.4 ---	<2 ---	Low-----	0.43	1	5
487* Olat-----	0-5 5-10 10-14	15-23 23-30 ---	0.6-2.0 0.6-2.0 ---	0.07-0.09 0.05-0.07 ---	6.1-7.8 6.1-7.8 ---	<2 <2 ---	Low----- Low-----	0.10 0.05	1	8
Eagle-----	0-4 4-24 24	20-27 35-50 ---	0.6-2.0 0.06-0.2 ---	0.10-0.11 0.13-0.15 ---	6.1-7.8 6.1-7.8 ---	<2 <2 ---	Low----- High-----	0.24 0.1	2	8
Oppl.-----	0-6 6-27 27	17-25 40-50 ---	2.0-6.0 0.06-0.2 ---	0.07-0.09 0.14-0.16 ---	7.4-7.8 7.4-7.8 ---	<2 <2 ---	Low----- High-----	0.24 0.17	2	8
488* Olat-----	0-3 3-10 10	10-20 23-30 ---	0.6-2.0 0.6-2.0 ---	0.04-0.07 0.05-0.07 ---	6.1-7.8 6.1-7.8 ---	<2 <2 ---	Low----- Low-----	0.05 0.05	1	8
Rubble land.										
Indiano-----	0-13 13-33 33	5-15 20-35 ---	2.0-6.0 0.2-0.6 ---	0.08-0.10 0.16-0.19 ---	6.1-7.3 6.1-7.3 ---	<2 <2 ---	Low----- Moderate-----	0.32 0.26	2	4
489* Olat-----	0-3 3-10 10	10-20 23-30 ---	2.0-6.0 0.6-2.0 ---	0.05-0.07 0.05-0.07 ---	6.1-7.8 6.1-7.8 ---	<2 <2 ---	Low----- Low-----	0.10 0.05	1	5
Smallcone-----	0-6 6	5-15 ---	6.0-20 ---	0.04-0.07 ---	5.1-6.0 ---	<2 ---	Low-----	0.10	1	6
Old Camp-----	0-2 2-14 14	10-20 27-35 ---	2.0-6.0 0.2-0.6 ---	0.11-0.13 0.08-0.11 ---	6.6-7.8 6.6-9.0 ---	<2 <2 ---	Low----- Low-----	0.17 0.15		8
519* Wooker-----	0-4 4-15 15-19	15-25 35-50 ---	0.6-2.0 0.06-0.2 ---	0.09-0.11 0.08-0.10 ---	6.6-7.8 6.6-7.8 ---	<2 <2 ---	Low----- Moderate-----	0.10 0.05	1	8
Zephania-----	0-8 8-35 35-42 42	10-15 35-45 ---	0.6-2.0 0.06-0.2 ---	0.11-0.13 0.10-0.13 ---	5.6-7.3 5.6-7.3 ---	<2 <2 ---	Low----- High-----	0.10 0.10		8
Olat-----	0-3 3-10 10	15-22 23-30 ---	0.6-2.0 0.6-2.0 ---	0.07-0.09 0.05-0.07 ---	6.1-7.8 6.1-7.8 ---	<2 <2 ---	Low----- Low-----	0.10 0.05	1	8
553----- Flu. stone	0-5 5-18 18-55	10-20 45-60 ---	0.6-2.0 0.06-0.2 ---	0.09-0.12 0.12-0.16 ---	6.1-7.3 6.6-8.4 ---	<2 <2 ---	Low----- High-----	0.28 0.17	1	7
554* Flu. stone	0-5 5-18 18-55	10-20 45-60 ---	0.6-2.0 0.06-0.2 ---	0.09-0.12 0.12-0.16 ---	6.1-7.3 6.6-8.4 ---	<2 <2 ---	Low----- High-----	0.28 0.17	1	7
Reno-----	0-7 7-23 23-50	5-15 35-50 ---	2.0-6.0 0.06 ---	0.08-0.12 0.14-0.16 ---	6.1-7.3 6.1-7.8 ---	<2 <2 ---	Low----- High-----	0.17 0.24	2	4

See footnote at end of table.

TABLE 71.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth		Permeability	Available water		Soil reaction	Salinity	Shrink-swell potential	Expansion factors		Wind erodibility group
	ft.	in.		in./in.	%				%	T	
571-- Ackley	0-2 3-27 27-60	2-8 26-27 8-15	2.0-6.0 0.6-2.0 2.0-6.0	0.08-0.12 0.10-0.16 0.09-0.12	6.1-7.3 6.1-7.3 6.6-9.0	<2 <2 <4	Low----- Moderate----- Low-----	0.15 0.2 0.37	5	4	
573* Ackley	0-2 2-34 34-60	2-5 26-27 8-15	2.0-6.0 0.6-2.0 2.0-6.0	0.08-0.12 0.10-0.16 0.09-0.12	6.1-7.3 6.1-7.3 6.6-9.0	<2 <2 <4	Low----- Moderate----- Low-----	0.15 0.37 0.32	5	4	
Veta	0-6 6-20 20-60	5-15 5-15 2-5	2.0-6.0 2.0-6.0 2.0-6.0	0.04-0.08 0.04-0.08 0.04-0.08	6.6-7.3 6.6-8 6.6-8.4	<2 <2 <2	Low----- Low----- Low-----	0.10 0.10 0.10	5	8	
602* P. 15  Drum											
875* Xman	0-2 2-14 14-27	2-5 40-50 ---	2.0-6.0 0.6-0.2 ---	0.10-0.12 0.14-0.16 ---	6.1-7.3 6.1-7.8 ---	<2 <2 ---	Low----- High----- ---	0.37 0.24 ---	1	3	
Zephan	0-3 3-31 31-40 40-45	2-5 35-45 --- ---	0.6-2.0 0.6-0.2 --- ---	0.10-0.15 0.16-0.19 --- ---	6.6-7.3 6.6-7.3 --- ---	<2 <2 --- ---	Low----- High----- --- ---	0.15 0.2 --- ---	2	4	
M. 261	0-8 8-12	5-5 ---	0.6-2.0 ---	0.10-0.12 ---	5.6-6.5 ---	<2 ---	Low----- ---	0.17 ---	1	5	
876* Xman	0-2 2-4 4-14 14-29 29-40	2-18 4-5 4-5 --- ---	2.0-6.0 0.6-0.2 --- --- ---	0.10-0.12 0.14-0.16 --- --- ---	6.1-7.3 6.1-7.8 --- --- ---	<2 <2 --- --- ---	Low----- High----- --- --- ---	0.37 0.24 --- --- ---	1	3	
Opp. 6	0-6 6-27 27	8-15 40-50 ---	2.0-6.0 0.6-0.2 ---	0.07-0.09 0.14-0.16 ---	7.4-7.8 7.4-7.8 ---	<2 <2 ---	Low----- High----- ---	0.28 0.17 ---	2	8	
Old Camp	0-2 2-14 14	5-15 27-35 ---	2.0-6.0 0.6-0.2 ---	0.10-0.12 0.14-0.16 ---	6.1-7.8 6.6-9.0 ---	<2 <2 ---	Low----- Low----- ---	0.1 0.25 ---	1	8	
877* Xman	0-5 5-18 18-35 35-39	2-18 40-50 --- ---	2.0-6.0 0.6-0.2 --- ---	0.10-0.12 0.14-0.16 --- ---	6.1-7.3 6.1-7.8 --- ---	<2 <2 --- ---	Low----- High----- --- ---	0.37 0.24 --- ---	1	3	
Duro	0-5 5-19 19	10-20 27-35 ---	0.6-2.0 0.2-0.6 ---	0.07-0.08 0.08-0.10 ---	6.1-7.8 6.1-7.8 ---	<2 <2 ---	Low----- Moderate----- ---	0.17 0.10 ---	1	5	
893* Indiana	0-13 13-33 33	5-15 20-35 ---	2.0-6.0 0.2-0.6 ---	0.10-0.12 0.16-0.19 ---	6.1-7.3 6.1-7.3 ---	<2 <2 ---	Low----- Moderate----- ---	0.32 0.28 ---	2	4	
Duro	0-5 5-19 19	10-20 27-35 ---	0.6-2.0 0.2-0.6 ---	0.07-0.08 0.08-0.10 ---	6.1-7.8 6.1-7.8 ---	<2 <2 ---	Low----- Moderate----- ---	0.17 0.10 ---	1	5	

See footnote at end of table.

TABLE 71.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth		Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group
	In	Pct	In/hr	In/in	pH	meq/liter		K	T	
893*: Eagle-----	0-4	27-35	0.1-0.6	0.06-0.12	6.1-7.2	<2	Moderate	0.18		
	4-24	35-50	0.06-0.2	0.13-0.15	6.1-7.2	<2	High	0.17		
	24	---	---	---	---	---	---	---	---	
894*: Indano-----	0-3	5-15	2.0-6.0	0.08-0.10	6.1-7.3	<2	Low	0.24	2	4
	3-36	10-35	0.1-0.6	0.1-0.14	6.1-7.3	<2	Moderate	0.18		
	36-40	---	---	---	---	---	---	---	---	
Devada-----	0-4	15-27	0.6-2.0	0.07-0.09	6.1-7.3	<2	Moderate	0.15	1	8
	4-13	4-6	0.06-0.2	0.14-0.16	6.1-7.3	<2	High	0.17		
	13	---	---	---	---	---	---	---	---	
100*: Teguro-----	0-2	10-18	0.6-2.0	0.12-0.15	6.1-7.3	<2	Low	0.28	1	6
	2-14	15-35	0.2-0.6	0.14-0.17	6.1-7.3	<2	Moderate	0.28		
	14-23	---	---	---	---	---	---	---	---	
Indano-----	0-13	5-15	0.1-6.0	0.10-0.12	6.1-7.3	<2	Low	0.32	2	4
	13-33	20-35	0.2-0.6	0.16-0.19	6.1-7.3	<2	Moderate	0.28		
	33	---	---	---	---	---	---	---	---	
71-----	0-3	15-27	0.6-2.0	0.09-0.11	5.6-7.2	<2	Low	0.10	2	7
	3-21	35-50	0.06-0.2	0.14-0.17	5.6-7.3	<2	High	0.20		
	21	---	---	---	---	---	---	---	---	
1,30*: Xetren-----	0-1	27-40	0.2-0.6	0.14-0.18	6.6-7.8	<2	Moderate	0.05	3	8
	1-15	40-60	0.06-0.2	0.12-0.14	7.4-8.4	<2	High	0.20		
	15-29	---	---	---	---	---	---	---	---	
Devada-----	0-4	15-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Moderate	0.17	1	8
	4-18	40-60	0.16-0.2	0.14-0.16	6.1-7.3	<2	High	0.17		
	18-22	---	---	---	---	---	---	---	---	
Inter-----	0-17	10-15	2.0-6.0	0.08-0.10	6.6-7.8	<2	Low	0.10	2	8
	17-36	15-35	0.2-0.6	0.09-0.14	6.6-7.8	<2	Moderate	0.10		
	36	---	---	---	---	---	---	---	---	
1410*: Burnborough-----	0-19	10-25	0.6-6.0	0.10-0.13	6.1-7.3	<2	Moderate	0.24	5	7
	19-60	18-35	0.6-2.0	0.08-0.11	6.1-7.3	<2	Moderate	0.15		
	60	---	---	---	---	---	---	---	---	
Salton-----	0-9	10-15	0.6-2.0	0.10-0.12	5.6-7.3	<2	Low	0.24	3	8
	9-15	24-35	0.2-0.6	0.05-0.09	5.6-7.3	<2	Low	0.15		
	15-19	---	---	---	---	---	---	---	---	
1511*: Eagle-----	0-4	10-27	0.6-2.0	0.10-0.11	6.1-7.8	<2	Low	0.24		8
	4-26	15-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High	0.17		
	26-42	---	---	---	---	---	---	---	---	
Nostac-----	0-9	27-30	0.2-2.0	0.12-0.14	6.1-7.3	<2	Moderate	0.28	5	8
	9-34	25-35	0.2-0.6	0.10-0.12	6.1-7.3	<2	Low	0.15		
	34-60	18-30	0.6-2.0	0.09-0.10	6.1-7.3	<2	Moderate	0.10		
1520*: Dulco-----	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low	0.17	1	5
	5-18	2-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.10		
	18-22	---	---	---	---	---	---	---	---	
Smallcone-----	0-6	5-15	6.0-20	0.04-0.07	5.1-6.0	<2	Low	0.10	1	6
	6	---	---	---	---	---	---	---	---	
	---	---	---	---	---	---	---	---	---	

See footnote at end of table.

TABLE 71.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth Clay		Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Frost factors		Wind erodibility group
	In	Pct	In/ft	In/in	pH	meq/100g		F	T	
1520* Cagle	0-4	27-35	0.2-0.6	0.16-0.17	6.1-7.8	<2	Moderate	0.28	2	8
	4-24	35-50	0.06-0.2	0.13-0.15	6.1-7.8	<2	High	0.17		
	24									
1521* Duro	0-5	10-20	0.6-2.0	0.07-0.08	6.1-7.8	<2	Low	0.15	1	8
	5-19	27-35	0.2-0.6	0.08-0.10	6.1-7.8	<2	Moderate	0.10		
	19									
Springmeyer	0-10	20-27	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate	0.32	5	5
	10-27	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate	0.20		
	27-60	18-25	0.2-0.6	0.11-0.13	6.6-8.4	<2	Moderate	0.20		
1530* Manogue	0-3	40-55	<0.06	0.12-0.14	6.1-8.4	<2	High	0.20	5	8
	3-41	40-55	<0.06	0.13-0.15	7.4-8.4	<4	High	0.28		
	41-63	40-55	<0.06	0.13-0.15	7.4-8.4	2-8	High	0.28		
	63									
Devada	0-4	25-27	0.6-2.0	0.08-0.10	6.1-7.3	<2	Moderate	0.17	1	8
	4-13	40-60	0.06-0.2	0.14-0.16	6.1-7.3	<2	High	0.17		
	13									
Rock outcrop.										
1531* Manogue	0-3	40-55	<0.06	0.14-0.16	6.1-8.4	<2	High	0.24	5	4
	3-41	40-55	<0.06	0.13-0.15	7.4-8.4	<4	High	0.28		
	41-63	40-55	<0.06	0.13-0.15	7.4-8.4	2-8	High	0.28		
	63									
Springmeyer	0-6	18-25	0.6-2.0	0.15-0.16	6.1-7.3	<2	Moderate	0.32	5	5
	6-16	25-35	0.2-0.6	0.14-0.16	6.1-7.3	<2	Moderate	0.20		
	16-60	22-30	0.2-2.0	0.10-0.13	6.6-8.4	<2	Moderate	0.20		
1533* Manogue	0-3	40-55	<0.06	0.14-0.16	6.1-8.4	<2	High	0.24	5	4
	3-41	40-55	<0.06	0.13-0.15	7.4-8.4	<4	High	0.28		
	41-63	40-55	<0.06	0.13-0.15	7.4-8.4	2-8	High	0.28		
	63									
1534* Manogue	0-3	40-55	<0.06	0.12-0.14	6.1-8.4	<2	High	0.26	5	8
	3-41	40-55	<0.06	0.13-0.15	7.4-8.4	<4	High	0.28		
	41-63	40-55	<0.06	0.13-0.15	7.4-8.4	2-8	High	0.28		
	63									
Hefed	0-2	10-20	6.0-20	0.03-0.08	6.6-8	<2	Low	0.10	5	6
	2-13	18-27	2.0-6.0	0.03-0.11	6.6-8.4	<2	Moderate	0.17		
	13-75	5-10	6.0-20	0.04-0.06	6.6-8.4	<2	Low	0.10		
Rock outcrop.										
1535* Manogue	0-3	40-55	<0.06	0.12-0.14	6.1-8.4	<2	High	0.20	5	8
	3-41	40-55	<0.06	0.13-0.15	7.4-8.4	<4	High	0.28		
	41-63	40-55	<0.06	0.13-0.15	7.4-8.4	2-8	High	0.28		
	63									

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 72.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than, > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated.

Soil name and map symbol	Hydro-logic group	Frequency of flooding	Depth to high water table	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
				Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
			Ft.	In		In				
021*: Bombardier-----	D	None-----	>6.0	7-14	Hard	---	---	Moderate	Moderate	Low.
Indiana-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	Moderate	Low.
051*: Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
Heford-----	B	None-----	>6.0	>60	---	---	---	Low-----	High-----	Low.
Rock outcrop.										
052*: Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
Rubble land.										
Rock outcrop.										
054*: Old Camp-----	L	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
Clac-----	L	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
Indiana-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	Moderate	Low.
060*: Cleaver-----	D	None-----	>6.0	>60	---	10-20	Thick	Low-----	High-----	Low.
Stingdom-----	D	None-----	>6.0	8-20	Hard	8-20	Thin	Low-----	High-----	Low.
062*: Cleaver-----	D	None-----	>6.0	>60	---	10-20	Thick	Low-----	High-----	Low.
Veta-----	B	Rare-----	>6.0	>60	---	---	---	Moderate	High-----	Low.

See footnote at end of table.

TABLE 72.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Frequency of flooding	Depth to high water table	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
				Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
			<u>Feet</u>	<u>In</u>		<u>In</u>				
080*:										
Wedekind-----	D	None-----	>6.0	10-20	Soft	---	---	Moderate	Moderate	Low.
Xman-----	D	None-----	>6.0	10-20	Soft	---	---	Low-----	Moderate	Low.
Indiana-----	C	None-----	>6.0	25-40	Hard	---	---	Moderate	Moderate	Low.
120*:										
Springmeyer-----	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Low.
Reno-----	D	None-----	>6.0	>60	---	20-40	Thick	Moderate	High-----	Low.
135*:										
Oppio-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	High-----	Moderate.
Norrac-----	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Low.
137*:										
Oppio-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	High-----	Moderate.
Raywal-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	Moderate	Low.
Indiana-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	Moderate	Low.
150*:										
Tristan-----	B	None-----	>6.0	40-60	Soft	---	---	Moderate	Moderate	Low.
Duco-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	Moderate	Low.
Heptan-----	C	None-----	>6.0	25-40	Soft	---	---	Moderate	Moderate	Moderate.
151*:										
Tristan-----	B	None-----	>6.0	40-60	Soft	---	---	Moderate	Moderate	Low.
Eynborough-----	B	None-----	>6.0	>60	---	---	---	Moderate	Moderate	Low.
Gabica-----	D	None-----	>6.0	12-20	Hard	---	---	Moderate	High-----	Low.
160*:										
Devada-----	D	None-----	>6.0	12-20	Hard	---	---	Low-----	Moderate	Low.
Rock outcrop.										

See footnote at end of table.



TABLE 72.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Frequency of flooding	Depth to high water table	Bedrock		Cemented sand		Potential frost action	Risk of corrosion	
				Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
			<u>ft</u>	<u>in</u>		<u>in</u>				
161*:										
Devada-----	D	None-----	>6.0	12-20	Hard	---	---	Low-----	Moderate	Low.
Nosiac-----	B	None-----	>6.0	>60	---	---	---	Moderate	Moderate	Low.
162*:										
Devada-----	D	None-----	>6.0	12-20	Hard	---	---	Low-----	Moderate	Low.
Olas-----	L	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
170*:										
Saratogui-----	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Moderate.
Isolde-----	A	None-----	>6.0	>60	---	---	---	Low-----	High-----	Low.
180*:										
Patna-----	B	None-----	>6.0	>60	---	---	---	Low-----	High-----	Low.
Badland.										
210*:										
Theon-----	D	None-----	>6.0	8-14	Hard	---	---	Low-----	High-----	Low.
Lapon-----	D	None-----	>6.0	10-40	Hard	8-14	Thick	Moderate	High-----	Low.
Olas-----	D	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
211*:										
Theon-----	D	None-----	>6.0	8-14	Hard	---	---	Low-----	High-----	Low.
Rock outcrop.										
Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
212*:										
Theon-----	D	None-----	>6.0	8-14	Hard	---	---	Low-----	High-----	Low.
Singatse-----	D	None-----	>6.0	4-10	Hard	---	---	Low-----	High-----	Low.

See footnote at end of table.

TABLE 72.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Frequency of flooding	Depth to high water table	Bedrock		Cemented sand		Potential frost action	Risk of corrosion	
				Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
			ft	in		in				
213*: Theon-----	D	None-----	>6.0	8-14	Hard	---	---	Low-----	High-----	Low.
Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
220*: Ister-----	C	None-----	>6.0	25-40	Hard	---	---	Moderate	Moderate	Low.
Devada-----	D	None-----	>6.0	12-20	Hard	---	---	Low-----	Moderate	Low.
221*: Ister-----	C	None-----	>6.0	25-40	Hard	---	---	Moderate	Moderate	Low.
Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
Rock outcrop.										
230: Sagoupe-----	C	Occasional-----	1.5-3.5	>60	---	---	---	High-----	High-----	Low.
231: Sagoupe-----	C	Rare-----	3.0-5.0	>60	---	---	---	Moderate	High-----	Low.
250*: Chalco-----	L	None-----	>6.0	10-20	Soft	---	---	Low-----	Moderate	Low.
Haar-----	D	None-----	>6.0	4-10	Soft	---	---	Moderate	Moderate	Low.
260*: Lapon-----	D	None-----	>6.0	10-40	Hard	8-14	Thick	Moderate	High-----	Low.
Fulstene-----	D	None-----	>6.0	>60	---	14-20	Thick	Moderate	High-----	Low.
Olar-----	D	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
275: Chill-----	D	None-----	>6.0	6-14	Soft	---	---	Moderate	Moderate	Low.
280, 281: Perdazo-----	B	None-----	>6.0	>60	---	---	---	Low-----	High-----	Low.
290: Springmeyer Variant-----	B	Rare-----	4.5-5.5	>60	---	---	---	Moderate	High-----	Low.

See footnote at end of table.

TABLE 72.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Frequency of flooding	Depth to high water table	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
				Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
			Ft.	In		In				
313*: Risley-----	C	None-----	>6.0	20-30	Soft	---	---	Low-----	Moderate	Low.
Rubble land.										
Devada-----	D	None-----	>6.0	12-20	Hard	---	---	Low-----	Moderate	Low.
314*: Risley-----	D	None-----	>6.0	20-30	Soft	---	---	Low-----	Moderate	Moderate.
Xman-----	D	None-----	>6.0	10-20	Soft	---	---	Low-----	Moderate	Low.
Rock outcrop.										
350, 351----- Hunewill	B	None-----	>6.0	>60	---	---	---	Moderate	Moderate	Low.
381----- Veta	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Low.
480*: Ciac-----	I	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
Bombadil-----	L	None-----	>6.0	7-14	Hard	---	---	Moderate	Moderate	Low.
Rock outcrop.										
483*: Olac-----	D	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
Rock outcrop.										
484*: Olac-----	D	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
Ister-----	C	None-----	>6.0	25-40	Hard	---	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 72.—SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Frequency of flooding	Depth to high water table	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
				Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
			<u>Ft</u>	<u>In</u>		<u>In</u>				
485*: Olac-----	D	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
Chalco-----	F	None-----	>6.0	10-20	Soft	---	---	Low-----	Moderate	Low.
Hsa-----	D	None-----	>6.0	4-10	Soft	---	---	Moderate	Moderate	Low.
487*: Can-----	D	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
Cagle-----	C	None-----	>6.0	20-40	Soft	---	---	Low-----	Moderate	Low.
Jpp-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	High-----	Moderate.
488*: Blac-----	F	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
Rubble land.										
Indano-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	Moderate	Low.
489*: Cdc-----	D	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
Emal, cone-----	F	None-----	>6.0	4-10	Soft	---	---	Low-----	Moderate	Moderate.
Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low
519*: Zomer-----	C	None-----	>6.0	14-20	Hard	---	---	Low-----	Moderate	Low.
Zephan-----	C	None-----	>6.0	25-40	Soft	---	---	Moderate	Moderate	Moderate.
Olac-----	F	None-----	>6.0	8-14	Hard	---	---	Moderate	Moderate	Low.
513: Fulstone-----	D	None-----	>6.0	>60	---	14-20	Thick	Moderate	High-----	Low.
554*: Fulstone-----	D	None-----	>6.0	>60	---	14-20	Thick	Moderate	High-----	Low.
Wend-----	C	None-----	>6.0	>60	---	20-40	Thick	Moderate	High-----	Low.
571: Ackley-----	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Low.

See footnote at end of table.

TABLE 72.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Frequency of flooding	Depth to high water table	Bedrock		Cemented sand		Potential frost action	Risk of corrosion	
				Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
			<u>Ft</u>	<u>In</u>		<u>In</u>				
572*: Ackley-----	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Low.
Veta-----	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Low.
604*: Pits.										
Dumps.										
875*: Xman-----	D	None-----	>6.0	10-20	Soft	---	---	Low-----	Moderate	Low.
Zephan-----	C	None-----	>6.0	25-40	Soft	---	---	Low-----	Moderate	Moderate.
Muzel-----	D	None-----	>6.0	7-10	Hard	---	---	Moderate	Moderate	Moderate.
876*: Xman-----	D	None-----	>6.0	10-20	Soft	---	---	Low-----	Moderate	Low.
Oppin-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	High-----	Moderate.
Old Camp-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	High-----	Low.
877*: Xman-----	D	None-----	>6.0	10-20	Soft	---	---	Low-----	Moderate	Low.
Duco-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	Moderate	Low.
893*: Indiana-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	Moderate	Low.
Duco-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	Moderate	Low.
Cagle-----	C	None-----	>6.0	20-40	Soft	---	---	Low-----	Moderate	Low.
894*: Indiana-----	C	None-----	>6.0	20-40	Hard	---	---	Moderate	Moderate	Low.
Devada-----	D	None-----	>6.0	12-20	Hard	---	---	Low-----	Moderate	Low.

See footnote at end of table.

TABLE 72.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Frequency of flooding	Depth to high water table	Bedrock		Cemented layer		Potential frost action	Risk of corrosion	
				Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
			<u>Ft</u>	<u>In</u>		<u>In</u>				
1010*:										
Tegoro-----	D	None-----	>6.0	14-20	hard	---	---	Moderate	Moderate	Low.
Indiana-----	"	None-----	>6.0	20-40	hard	---	---	Moderate	Moderate	Low.
Oppio-----	"	None-----	>6.0	20-40	Hard	---	---	Low-----	Moderate	Moderate.
1030*:										
Xerta-----	C	None-----	>6.0	20-40	Hard	20-40	Thin	Moderate	High-----	Low
Nevada-----	D	None-----	>6.0	12-20	hard	---	---	Low-----	Moderate	Low.
Ister-----	C	None-----	>6.0	25-40	Hard	---	---	Moderate	Moderate	Low.
1410*:										
Butterbaugh-----	B	None-----	>6.0	>60	---	---	---	Moderate	Moderate	Low.
Gabica-----	I	None-----	>6.0	12-20	hard	---	---	Moderate	High-----	Low.
1511*:										
Cagle-----	C	None-----	>6.0	20-40	Soft	---	---	Low-----	Moderate	Low.
Nostrac-----	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Low.
1520*:										
Duco-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	Moderate	Low
Smallcone-----	D	None-----	>6.0	4-10	Soft	---	---	Low-----	Moderate	Moderate.
Cagle-----	C	None-----	>6.0	20-40	Soft	---	---	Low-----	Moderate	Low.
1521*:										
Duco-----	D	None-----	>6.0	10-20	Hard	---	---	Moderate	Moderate	Low.
Springmeyer-----	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Low.
1530*:										
Manogue-----	D	None-----	>6.0	>60	---	---	---	Low-----	High-----	Low.
Nevada-----	D	None-----	>6.0	12-20	Hard	---	---	Low-----	Moderate	Low.
Rock outcrop.										

See footnote at end of table.

TABLE 72.—SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Frequency of flooding	Depth to high water table	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
				Depth	Hardness	Depth	Thickness		Incoated steel	Concrete
			Ft	In		In				
1531*: Manogue-----	D	None-----	>6.0	>60	---	---	+	Low-----	High-----	Low.
Springmeyer-----	B	None-----	>6.0	>60	---	---	---	Moderate	High-----	Low
1533----- Manogue	D	None-----	>6.0	>60	---	---	---	Low-----	High-----	Low.
1534*: Manogue-----	D	None-----	>6.0	>60	---	---	---	Low-----	High-----	Low.
Refed-----	B	None-----	>6.0	>60	---	---	---	Low-----	High-----	Low.
Rock outcrop.										
1535----- Manogue	D	None-----	>6.0	>60	---	---	---	Low-----	High-----	Low.

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 73.--CLASSIFICATION OF THE SOILS

An asterisk in the first column indicates that the soil is a taxadunt to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

Soil name	Family or higher taxonomic class
Ackley-----	Fine-loamy, mixed, mesic Xerollic Haplargids
Bombadil-----	Loamy, mixed, mesic Lithic Xerollic Haplargids
Burnborough-----	Loamy-skeletal, mixed, frigid Aridic Argixerolls
Calico-----	Fine, montmorillonitic, mesic Aridic Argixerolls
Chico-----	Clayey, montmorillonitic, mesic, shallow Xerollic Haplargids
Chico 1-----	Loamy, mixed, mesic, shallow Xerollic Haplargids
Chico 2-----	Loamy, mixed, mesic, shallow Typic Durargids
Devada-----	Clayey, montmorillonitic, mesic Lithic Argixerolls
El Paso-----	Loamy-skeletal, mixed, mesic Lithic Argixerolls
El Paso 1-----	Clayey, montmorillonitic, mesic, shallow Abruptic Xerollic Durargids
El Paso 2-----	Loamy-skeletal, mixed, frigid Lithic Argixerolls
El Paso 3-----	Loamy, mixed, nonacid, mesic, shallow Xeric Torriorthents
El Paso 4-----	Loamy-skeletal, mixed, mesic Xerollic Haplargids
El Paso 5-----	Loamy-skeletal, mixed, mesic Xerollic Haplargids
El Paso 6-----	Fine-loamy, mixed, mesic Aridic Argixerolls
El Paso 7-----	Mixed, mesic Typic Torripsamments
El Paso 8-----	Loamy-skeletal, mixed, mesic Aridic Argixerolls
El Paso 9-----	Loamy-skeletal, mixed, mesic, shallow Xerollic Durargids
El Paso 10-----	Clayey-skeletal, montmorillonitic, mesic Lithic Argixerolls
El Paso 11-----	Fine, montmorillonitic, mesic, shallow Xeric Torriorthents
El Paso 12-----	Loamy-skeletal, mixed, nonacid, mesic Lithic Torriorthents
El Paso 13-----	Loamy-skeletal, mixed, mesic Aridic Argixerolls
El Paso 14-----	Loamy-skeletal, mixed, mesic Lithic Xerollic Haplargids
El Paso 15-----	Loamy-skeletal, mixed, mesic Lithic Xerollic Haplargids
El Paso 16-----	Fine, montmorillonitic, mesic Xerollic Haplargids
El Paso 17-----	Coarse-loamy, mixed, mesic Typic Haplargids
El Paso 18-----	Loamy-skeletal, mixed, mesic Typic Haplargids
El Paso 19-----	Fine, montmorillonitic, mesic Abruptic Xerollic Durargids
El Paso 20-----	Loamy-skeletal, mixed, mesic Lithic Argixerolls
El Paso 21-----	Fine, montmorillonitic, mesic Xerollic Haplargids
El Paso 22-----	Sandy, mixed, mesic Aquic Xerofluvents
El Paso 23-----	Coarse-loamy, mixed, mesic Xerollic Haplargids
El Paso 24-----	Loamy-skeletal, mixed (calcareous), mesic Lithic Torriorthents
El Paso 25-----	Loamy-skeletal, mixed, nonacid, mesic Lithic Xeric Torriorthents
El Paso 26-----	Fine-loamy, mixed, mesic Aridic Argixerolls
El Paso 27-----	Fine-loamy, mixed, mesic Pacific Argixerolls
El Paso 28-----	Loamy-skeletal, mixed, mesic, shallow Typic Durargids
El Paso 29-----	Loamy, mixed, frigid Lithic Argixerolls
El Paso 30-----	Loamy-skeletal, mixed, mesic Lithic Haplargids
El Paso 31-----	Loamy-skeletal, mixed, mesic Aridic Argixerolls
El Paso 32-----	Loamy-skeletal, mixed, mesic Xerollic Camborthids
El Paso 33-----	Loamy, mixed, mesic, shallow Aridic Argixerolls
El Paso 34-----	Fine, montmorillonitic, mesic, shallow Xeric Torriorthents
El Paso 35-----	Clayey, montmorillonitic, mesic, shallow Xerollic Haplargids
El Paso 36-----	Clayey-skeletal, montmorillonitic, mesic Xerollic Haplargids



## Appendix

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This appendix consists of materials extracted from various sources that provided the basis for many of the interpretive ratings given in this SOI survey. These materials are as follows:

**Table 603-10. Septic tank absorption fields**

**Table 603-15. Shallow excavations**

**Table 603-16. Dwellings without basements**

**Table 603-19. Local roads and streets**

**Table 603-21. Roadfill**

**Guide for rating soils according to their relative suitability for range seedings in Nevada**

**Guide for estimating erosion hazard (bare soil) - in Nevada**

**Classification of bolson landforms**

**Classification of semibolson landforms**

## Part 603 - Application of Soil Information

603.03-1(a) (5)

Table 603-10. Septic tank absorption fields.

PROPERTY	LIMITS			RESTRICTIVE FEATURE
	SLIGHT	MODERATE	SEVERE	
1. USDA TEXTURE	---	---	ICE	PERMAFROST
2. TOTAL SUBSIDENCE (IN)	---	---	>24	SUBSIDES
3. FLOODING	NONE	RARE	COMMON	FLOODING
4. DEPTH TO BEDROCK (IN)	>72	40-72	<40	DEPTH TO ROCK
5. DEPTH TO CEMENTED PAN (IN)	>72	40-72	<40	CEMENTED PAN
6. DEPTH TO HIGH WATER TABLE (FT)	---	---	+	PONDING
	>6	4-6	<4	WETNESS
7. PERMEABILITY (IN/HR): .24-50") (24-40")	2.0-6.0 ---	1/0.6-2.0 ---	<0.6 >6.0	PEEPS SLOWLY POOR FILTER
8. SLOPE (PCT)	<8	8-15	>15	SLOPE
9. 1/ FRACTION >3 IN (WT PCT)	<25	25-50	>50	LARGE STONES
10. DOWNSLOPE MOVEMENT	---	---	<u>II</u> /	SLIPPAGE
11. FORMATION OF PITS	---	---	<u>III</u> /	PITTING

1/Weighted average to 40 inches.

I/Recheck to see if rating should be SLIGHT

II/If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate "SEVERE-SLIPPAGE."

III/If soil is susceptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate "SEVERE-PITTING."

(430-VI-NSH, July 1983)

603-61

## Part 603 - Application of Soil Information

603.03-2-(a) (2)

Table 603-15. Shallow excavations.

PROPERTY	LIMITS			RESTRICTIVE FEATURE
	SLIGHT	MODERATE	SEVERE	
1. USDA TEXTURE	---	---	ICE	PERMAFROST
2. DEPTH TO BEDROCK (IN):				DEPTH TO ROCK
HARD	>60	40-60	<40	
SOFT	>40	20-40	<20	
3. DEPTH TO CEMENTED PAN (IN):				CEMENTED PAN
THICK	>60	40-60	<40	
THIN	>40	20-40	<20	
4. USDA TEXTURE (20-60")	---	VII/ SI	COS, S, FS, VFS, LCOS, LS, LFS, LVFS, G, SG	CUTBANKS CAVE
5. USDA TEXTURE (20-60")	---	C, SIC	---	TOO CLAYEY
6. SOIL ORDER	---	---	VERTISOLS	CUTBANKS CAVE
7. BULK DENSITY (G/CC) (20-60)	---	>1.8	---	DENSE LAYER
8. UNIFIED (20-60")	---	---	OL, OM, PT	EXCESS HUMUS
9. 1/FRACTION >3 IN (WT PCT)	<25	25-50	>50	LARGE STONES
10. DEPTH TO HIGH WATER TABLE (FT)	---	---	+	PONDING WETNESS
	>6	2.5-6	<2.5	
11. FLOODING	NONE, RARE	COMMON	---	FLOODING
12. SLOPE (PCT)	<8	8-15	>15	SLOPE
13. DOWNSLOPE MOVEMENT	---	---	II/	SLIPPAGE

1/Weighted average to 40 inches.

II/If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate "SEVERE-SLIPPAGE."

VII/If loess, rating should be SLIGHT.

## Part 603 - Application of Soil Information

603.03-2(b)(2)

Table 603-16. Dwellings without basements.

PROPERTY	LIMITS			RESTRICTIVE FEATURE
	SLIGHT	MODERATE	SEVERE	
1. USDA TEXTURE	---	---	ICE	PERMAFROST
2. TOTAL SUBSIDENCE (IN)	---	---	>12	SUBSIDES
3. FLOODING	NONE	---	RARE, COMMON	FLOODING
4. DEPTH TO HIGH WATER TABLE (FT)	---	---	+	PONDING WETNESS
	>2.5	1.5-2.5	<1.5	
5. 9/SHRINK-SWELL	LOW	MODERATE	HIGH, VERY HIGH	SHRINK-SWELL
6. 9/UNIFIED	---	---	OL, OH, PT	LOW STRENGTH
7. SLOPE (PCT)	<8	8-15	>15	SLOPE
8. DEPTH TO BEDROCK IN HARD SOFT	>40 >20	20-40 <20	<20 ---	DEPTH TO ROCK
9. DEPTH TO CEMENTED PAN (IN); THICK THIN	>40 >20	20-40 <20	<20 ---	CEMENTED PAN
10. 1/FRACTION >3 IN (WT PCT)	<25	25-50	>50	LARGE STONES
11. DOWNSLOPE MOVEMENT	---	---	II/	SLIPPAGE
12. FORMATION OF PITS	---	---	III/	PITTING
13. DIFFERENTIAL SETTLING	---	---	V/	UNSTABLE FILL

1/Weighted average to 40 inches.

9/Thickest layer between 10 and 40 inches.

II/If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate "SEVERE-SLIPPAGE."

III/If the soil is susceptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate "SEVERE-PITTING."

V/If the soil is susceptible to differential settling, rate "SEVERE-UNSTABLE FILL."

603-73

(430-VI-NSH, July 1983)

## Part 603 - Application of Soil Information

603.03-2(e)(2,

Table 603-19. Local roads and streets.

PROPERTY	LIMITS			RESTRICTIVE FEATURE
	SLIGHT	MODERATE	SEVERE	
1. USDA TEXTURE	---	---	ICE	PERMAFROST
2. TOTAL SUBSIDENCE	---	---	>12	SUBSIDES
3. DEPTH TO BEDROCK (IN): HARD SOFT	>40 >20	20-40 <20	<20 ---	DEPTH TO ROCK
4. DEPTH TO CEMENTED PAN (IN): THICK THIN	>40 >20	20-40 <20	<20 ---	CEMENTED PAN
5. 9/SHRINK-SWELL	LOW	MODERATE	HIGH, VERY HIGH	SHRINK-SWELL
6. 5/, 9/, 10/ASSHTO GROUP INDEX NUMBER	<5	5-8	>8	LOW STRENGTH
7. DEPTH TO HIGH WATER TABLE (FT)	---	---	+	PONDING WETNESS
	>2.5	1.0-2.5	<1.0	
8. SLOPE (PCT)	<8	8-15	>15	SLOPE
9. FLOODING	NONE	RARE	COMMON	FLOODING
10. POTENTIAL FROST ACTION	LOW	MODERATE	HIGH	FROST ACTION
11. 1/FRACTION >3 IN (WT PCT)	<25	25-50	>50	LARGE STONES
12. DOWNSLOPE MOVEMENT	---	---	<u>II</u> /	SLIPPAGE
13. FORMATION OF PITS	---	---	<u>III</u> /	PITTING
14. DIFFERENTIAL SETTLING	---	---	<u>V</u> /	UNSTABLE FILL

1/Weighted average to 40 inches.

5/If in kaolinitic family, rate one class better if experience confirms.

9/Thickest layer between 10 and 40 inches.

10/GIN =  $F-15 [0.2 + 0.005 (L-40)] + 0.01 [F-15, (P-10)]$  where  $F$  = % passing No. 200 sieve. If  $F < 35$  and  $PI > 11$ , use only part 2 of equation. Use median values.

11/If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate "SEVERE-SLIPPAGE."

13/If the soil is susceptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate "SEVERE-PITTING."

14/If the soil is susceptible to differential settling, rate "SEVERE-UNSTABLE FILL."

## Part 603 - Application of Soil Information

603.03-3(a,

Table 603-21. Roadfill.

PROPERTY	LIMITS			RESTRICTIVE FEATURE
	GOOD	FAIR	POOR	
1. USDA TEXTURE	---	---	ICE	PERMAFROST
2. DEPTH TO BEDROCK (IN)	>60	40-60	<40	DEPTH TO ROCK
3. DEPTH TO CEMENTED PAN (THICK) (IN)	>60	40-60	<40	CEMENTED PAN
4. <u>12</u> /SHRINK-SWELL	LOW	MODERATE	HIGH, VERY HIGH	SHRINK-SWELL
5. <u>5</u> /, <u>10</u> /, <u>12</u> /ASSHTO GROUP INDEX NUMBER	<5	5-8	>8	LOW STRENGTH
6. LAYER THICKNESS (IN)	>60	30-60	<30	THIN LAYER
7. <u>1</u> /FRACTION >3 IN (WT PCT)	<25	25-50	>50	LARGE STONES
8. DEPTH TO HIGH WATER TABLE (FT)	>3	1-3	<1	WETNESS
9. SLOPE (PCT)	<15	15-25	>25	SLOPE

1/Weighted average to 40 inches.

5/If in kaolinitic family, rate one class better if experience confirms.

10/GIN =  $(F-35) [ .2 + .005(LL-40) ] + .01(F-15)(PI-10)$  where F = % passing.

No. 200 sieve. If  $F < 35$  and  $PI > 11$ , use only part 2 of equation. Use median values.

12/Evaluate the thickest layer between 10 and 60 inches and also the bottom layer. Choose the best rating. When rating is based on bottom layer, verify thickness.

XVIII/If the content of gypsum is 10 to 15 percent, rate "FAIR-EXCESS GYPSUM." If it exceeds 15 percent, rate "POOR-EXCESS GYPSUM."

GUIDE FOR RATING SOILS ACCORDING TO THEIR RELATIVE SUITABILITY FOR RANGE SEEDINGS IN NEVADA

USDA-ARS, FS, SCS  
USDI-BLM  
UNR-AG. EXP. STA.

Soil Property	Limits			Restrictive feature
	Good	Fair	Poor	
Moisture regime.	Aquic, xeric, ustic, and xeric and ustic bordering on aridic or torric.	Aridic and torric bordering on aquic, xeric or ustic.	Aridic and torric.	Too arid
Effective moisture. 1/	>10 ins. (25 cm).	7-10 ins. (17.5-25 cm).	<7 ins. (17.5 cm).	Too arid
Available water capacity.	Surface 10 ins. (25 cm) >1.25 ins. (3.2 cm). Soil profile >4 ins. (10.2 cm).	Surface 10 ins. (25 cm) 0.75-1.25 ins. (1.9-3.2 cm). Soil profile 2.5-4 ins. (6.4-10.2 cm).	Surface 10 ins. (25 cm) <0.75 ins. (1.9 cm). Soil profile <2-3 ins. (6.4 cm).	Droughty
Texture surface 7 ins. 17.5 cm.	LVFS, COSL, SL, FSL, VPS, 1 SIL, SCL, and CL SICL with <35% C.	VFS, LPS, SC, SIC, C and CL and SICL with >35% C.	LS, LCOS, FS, COS.	Too sandy Too clayey
Rock fragments in surface 7 ins. (17.5 cm)	GR <35%; CB <15%; ST <3%. Total rock fragments <35%.	GR <35%; CB 15-35%; ST 3-15%. Total rock fragments <35%.	GR >35%; CB 35%; ST 15%. Total rock fragments >35%.	Small stones Large stones
Depth to abrupt A-B texture boundary. 2/	>10 ins. (25 cm).	>10 ins. (25 cm).	<10 ins. (25 cm).	Rooting depth
Depth to bedrock or hardpan	>20 ins. (50 cm).	10-20 ins. (25-50 cm).	<10 ins. (25 cm).	Depth to rock Cemented pan
Electrical conductivity by natural or extract-25 C.	<2 mmhos/cm (0.2 s/m) in upper 20 ins. (50 cm).	2-4 mmhos/cm (0.2-0.4 s/m) in upper 10 ins. (25 cm) and 4-8 mmhos/cm (0.4-0.8 s/m) in 10-20 (25-50 cm).	>4 mmhos/cm (0.4 s/m) in upper 10 ins. (25 cm) and/or >8 mmhos/cm (0.8 s/m) in 10-20 ins. (25-50 cm).	Excess salts
Sodium adsorption ratio	<8 in upper 20 ins. (50 cm).	8-12 in upper 10 ins. (25 cm) and <20 in 10-20 ins. (25-50 cm).	>12 in upper 10 ins. (25 cm) and/or >20 in 10-20 ins. (25-50 cm).	Excess sodium
R x % slope 3/	<4 4/; <6 5/	4-6 4/; 6-8 5/	>6 4/; >8 5/	Erodes easily
T x C 6/	<60	<60	>60	Soil blowing

## GUIDE FOR RATING SOILS ACCORDING TO THEIR RELATIVE SUITABILITY FOR RANGE SEEDINGS IN NEVADA--Continued

USDA-ARS, FS, SCS  
USDI-BLM  
UNR-AG. EXP. STA.

Soil Property	Limits			Restrictive Feature
	Good	Fair	Poor	
Soil surface morphological types. <u>7/</u>	Types I & II >60%; Type IV <5%, or with mollic epipedon <u>8/</u>	Types I & II >60%; Type IV <10% <u>8/</u>	Type III <60%, Type IV >10% <u>8/</u>	Too crusty
<u>1/</u> Moisture from precipitation, run-on, and groundwater budgeted to actual evapotranspiration. <u>2/</u> Rate Vertisols and Vertic subgroups as poor. <u>3/</u> Sheet and rill erosion hazard (bare soil). <u>4/</u> For ustic bordering on aridic or torric, and aridic or torric bordering on ustic moisture regimes. <u>5/</u> For xeric, xeric bordering on aridic or torric, and aridic or torric bordering on xeric moisture regimes. <u>6/</u> Wind erosion hazard (bare soil). <u>7/</u> See. (1) Final Report. Properties, Occurrence and Management of Soils with Vesicular Surface Horizons, 1977. Contract No. 52500-CT 5(N). USDI-BLM and UNR-Ag. Exp. Sta. Eckert, Peterson, Wood, and Blackburn; and (2) Final Report. Properties, Occurrence and Management of Soils with Vesicular Surface Horizons-Effects of Trampling on Seedling Emergence. 1979. Contract No. YA 512-CT 7-14. USDI-BLM and UNR-Ag. Exp. Sta. Stephens, Eckert, and Peterson. <u>8/</u> Soils without crusting morphology are to be included in Types I & II for rating.				



## 302.7(a)(1)(ii) Descriptive Legend - preparation of mapping unit descriptions

Guide for Estimating Erosion Hazard (BARE SOIL) - in Nevada.

	Water K x S (percent slope)	Wind I x C (climatic factor)
Slight	<4	<60
Moderate	4-8	60-100
High	>8	>100

## CLASSIFICATION OF BOLSON LANDFORMS

.....landforms.....			.....parts of landforms.....	
I Major Physiographic Part	II Major Landform	III Component Landform	IV Landform Element	V Slope Component
Bounding Mountains . . .	(not defined . . .	. . .	. . .	. . .
Piedmont Slope	Alluvial Fan	Fan Collar Erosional Fan Remnant	Channel Summit Sideslope.....	Shoulder Backslope Footslope
		Inset Fan	Channel	
	Fan Piedmont	Erosional Fan Remnant	Summit Sideslope.....	Shoulder Backslope Footslope
			Partial Ballena.....	Crest Shoulder Backslope
		Inset Fan	Channel	
		Fan Apron	Channel	
		Nonburied Fan Remnant	Channel	
	Fan Skirt	. . .	Channel	
Basin Floor (Bolson Floor)	Alluvial Flat	Alluvial Flat Remnant	Channel	
	Alluvial Plain			
	Sand Sheet	Sand Dune	Interdune Flat	
	Beach Plain	Offshore Bar Barrier Bar Lagoon	Channel	
	Lake Plain	Lake-Plain Terrace	Channel	
	Playa	Floodplain Playa	Channel	

## CLASSIFICATION OF SEMIBOLSON LANDFORMS

.....landforms.....			.....parts of landforms.....	
I Major Physiographic Part	II Major Landform	III Component Landform	IV Landform Element	V Slope Component
Bounding Mountains . .	[not defined] . . .	. . .	. . .	. . .
Piedmont Slope	Ballena	. . .	. . .	Crest Shoulder Backslope Footslope
		Inset Fan	Channel Channel	
	Alluvial Fan	Fan Collar Erosional Fan Remnant	Channel Summit Sideslope.....	Shoulder Backslope Footslope
	Fan Piedmont	Erosional Fan Remnant	Summit Sideslope.....	Shoulder Backslope Footslope
			Partial Ballena.....	Crest Shoulder Backslope Footslope
		Inset Fan Fan Apron	Channel Channel Channel	
	Fan Skirt	. . .	Channel	
Basin Floor (Semibolson Floor)	Alluvial Flat	Alluvial Flat		
		Alluvial Flat Remnant	Channel Channel	
	Alluvial Plain	Basin-Floor Remnant		
	Sand Sheet	Sand Dune		
	Axial-Stream Floodplain	Floodplain Stream Terrace	Channel	

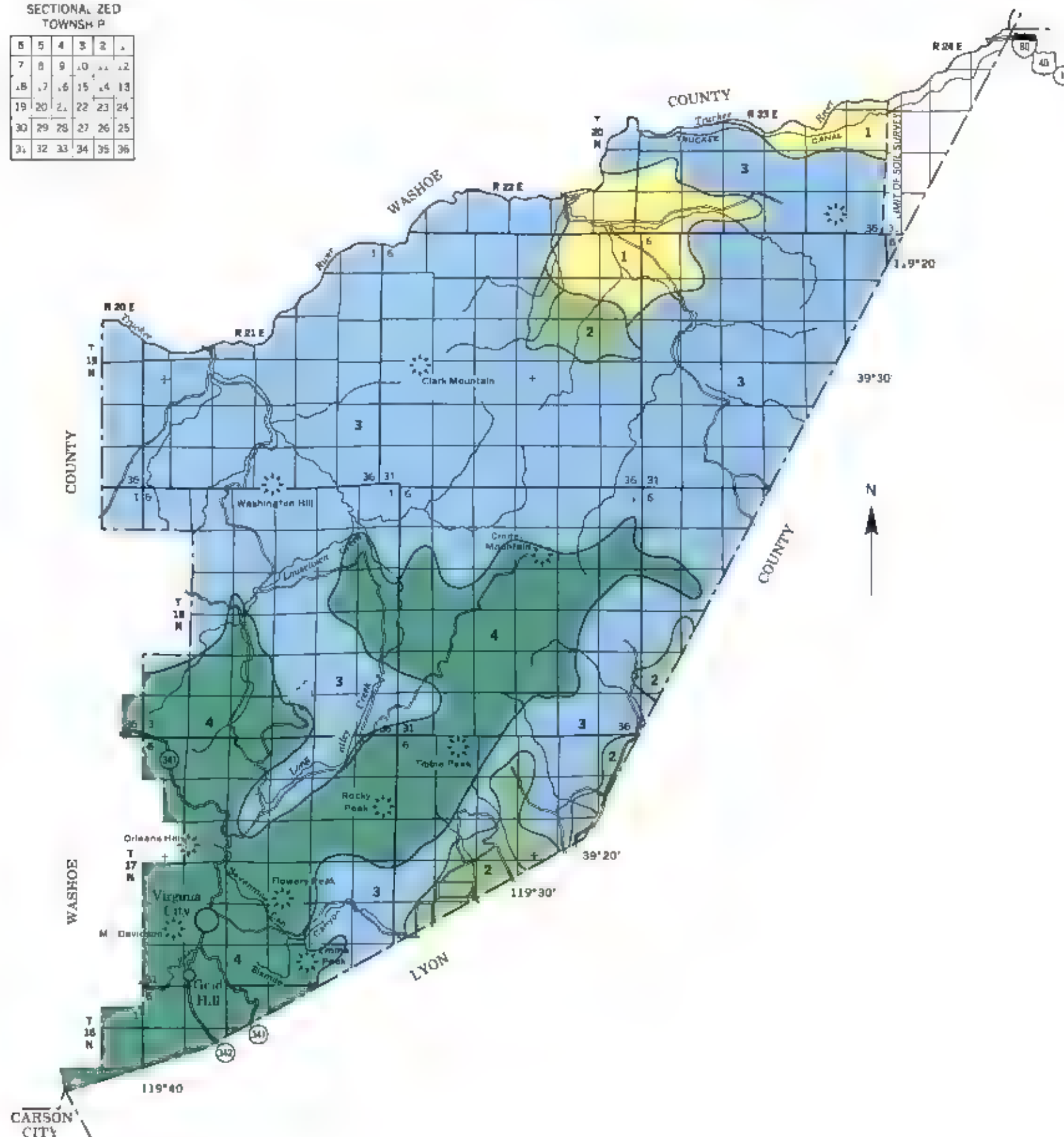
## NRCS Accessibility Statement

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# SECTIONAL ZED TOWNSHIP

8	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36



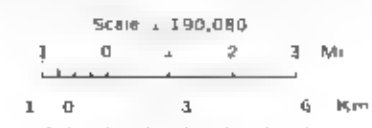
## LEGEND

- 1** TYPIC DURARGIDS-LITHIC HAPLARGIDS: Gently sloping to very steep, shallow, well drained soils, on piedmont slopes and foothills.
- 2** ABRUPTIC XEROLIC DURARGIDS-XEROLIC HAPLARGIDS: Gently sloping to moderately steep, shallow, moderately deep and very deep, well drained soils, on piedmont slopes.
- 3** LITHIC XEROLIC HAPLARGIDS-XEROLIC HAPLARGIDS-ENTIC CHROMOXERENTS: Moderately sloping to very steep, shallow to deep, well drained soils, on mountains, foothills and mountain valley fans and intermontane basins.
- 4** ARIDIC ARGXEROLLS-LITHIC ARGIXEROLLS-LITHIC XEROLIC HAPLARGIDS: Moderately steep to very steep, shallow to deep, well drained soils on high mountains.

Compiled 1989

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
UNIVERSITY OF NEVADA AGRICULTURAL EXPERIMENT STATION  
U. S. DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

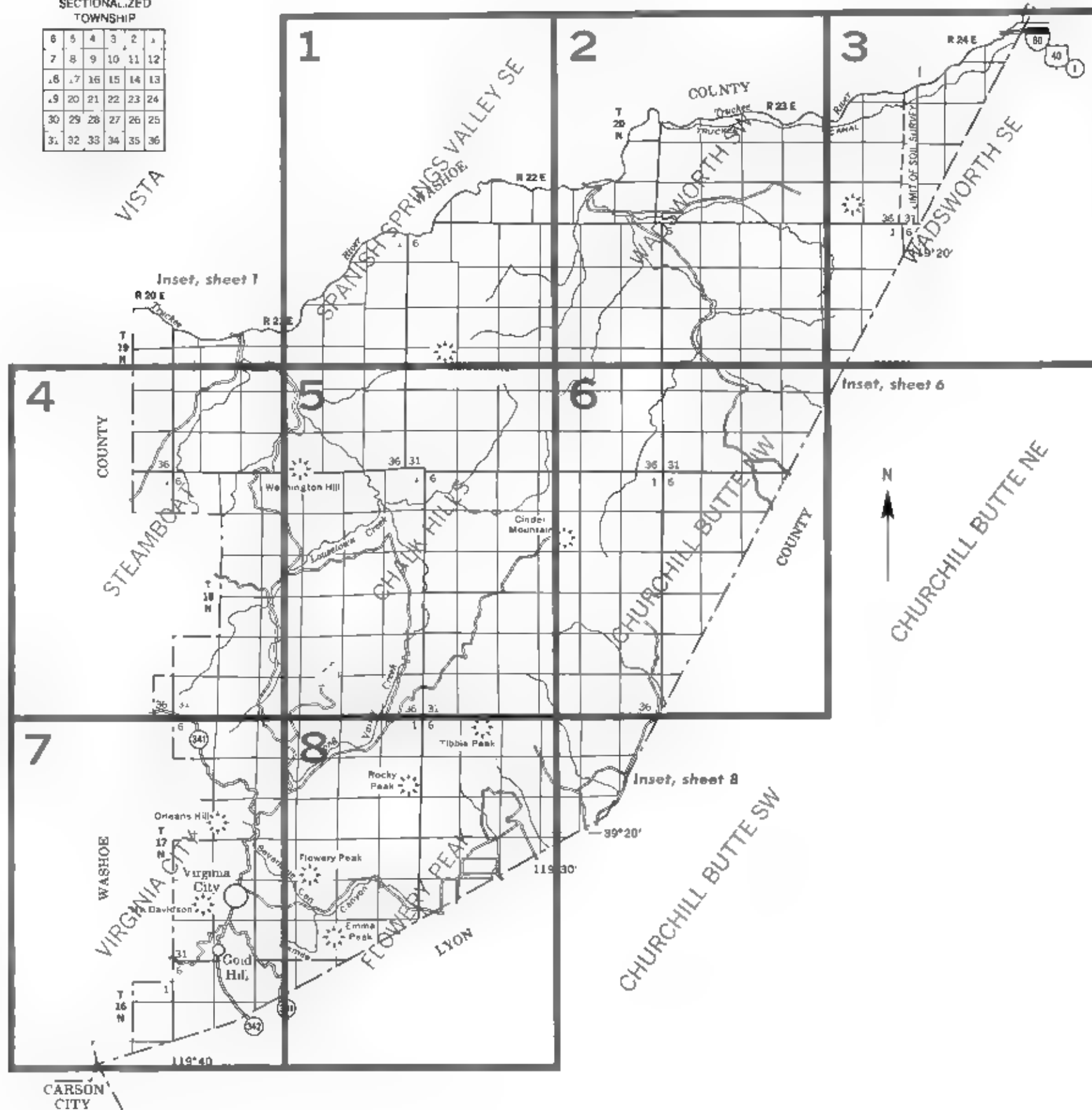
## GENERAL SOIL MAP STOREY COUNTY AREA, NEVADA



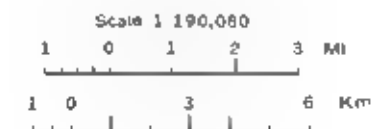
Each area outlined on this map consists of more than one kind of soil. The map is thus intended for general planning rather than a basis for decisions on the use of specific tracts.

SECTIONALIZED  
TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
16	17	18	19	20	21
22	23	24	25	26	27
28	29	30	31	32	33
34	35	36	37	38	39



INDEX TO MAP SHEETS  
STOREY COUNTY AREA, NEVADA



## SOIL LEGEND

SYMBOL	NAME
2	Bombadil-Indian association
05	Old Camp-Heted Rock outcrop association
052	Old Camp-Rubble Land Rock outcrop complex (30 to 75 percent slopes)
054	Old Camp-Old Indian association
060	Creeper-Singdorm association
062	Creeper-Vera association
082	Wedekind-Ximan and association
20	Springmeyer-Reno association
35	Oppio-Nogral association
37	Oppio-Raywa-Indian association
150	Tri-an-Du-a-Zephra association
5	Tri-an-Burnborough-Gabica association
60	Devada-Rock outcrop complex (5 to 50 percent slopes)
6	Devada-Nogral association
62	Devada-Old Camp association
70	Saralegui-solde association
80	Pama-Badiana association
210	Theon-Lapon-Old association
2	Theon Rock outcrop-Old Camp association
222	Theon-Singdorm association
23	Theon-Old Camp association
220	Tri-an-Devada association
221	Tri-an-Old Camp-Rock outcrop association
230	Sagouspe sandy dune (0 to 2 percent slopes or occasionally flooded)
23	Sagouspe sandy dune (0 to 2 percent slopes rarely flooded)
250	Chalco-Haar association
260	Lapon-Fulsone-Old association
275	Chill coarse sand (8 to 30 percent slopes)
280	Perazzo very gravelly sandy dune (2 to 4 percent slopes)
28	Perazzo very stony sandy dune (4 to 5 percent slopes)
290	Springmeyer variant dune (0 to 2 percent slopes)
33	Risley Rubble Land-Devada association
34	Risley Xman Rock outcrop association
350	Hunewill gravelly sandy dune (2 to 4 percent slopes)
35	Hunewill very gravelly sandy dune (4 to 5 percent slopes)
38	Vera very gravelly sandy dune (2 to 5 percent slopes)
480	Old-Bombadil-Rock outcrop association
483	Old-Old Camp Rock outcrop association
484	Old-Old Camp-solde association
485	Old-Chalco-Haar association
487	Old-Cagle-Opie association
488	Old Rubble Land-Indian association
489	Old-Smallhorn-Old Camp association
50	Loomer-Zephra-Old association
513	Fulsone cobbly dune (4 to 30 percent slopes)
514	Fulsone-Reno association
571	Ackley gravelly sandy dune (2 to 4 percent slopes)
572	Ackley-Vera complex (2 to 5 percent slopes)
612	Pike-Dumps complex
85	Xman-Zephra-Mizel association
86	Xman-Opie-Old Camp association
87	Xman-Luce association
893	Indian-Du-a-Cagle association
894	Indian-Devada association
010	Teguro-Indian-Opie association
030	Keria-Devada-solde association
40	Burnborough-Gabica association
5	Cagle-Nogral association
520	Duco-Smallhorn-Cagle association
52	Duco-Springmeyer association
530	Manogue Devada Rock outcrop association
53	Manogue-Springmeyer association
533	Manogue cobbly dune (2 to 5 percent slopes)
534	Manogue Heted Rock outcrop association
535	Manogue very stony dune (2 to 15 percent slopes)

CONVENTIONAL AND SPECIAL  
SYMBOLS LEGEND

## CULTURAL FEATURES

## BOUNDARIES

National, state or province



County or parish



Minor civil division

Reservation, national forest or park  
(state forest or park  
and large airport)

Land grant



Limit of soil survey (label)



Field sheet matenline and neeline



AD-HOC BOUNDARY (label)

Small airport, airfield, park, oilfield,  
cemeteries, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNER  
(sections and land grants)

## ROADS

Divided (median shown  
if scale permits)

Other roads



Trail



## ROAD EMBLEM &amp; DESIGNATIONS

Interstate



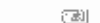
Federal



State



County, farm or ranch

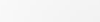


## RAILROAD

POWER TRANSMISSION LINE  
(normally not shown)PIPE LINE  
(normally not shown)FENCE  
(normally not shown)

## LEVEES

Without road



With road



With railroad



## DAMS

Large (to scale)



Medium or Small



## PITS

Gravel pit



Mine or quarry



## MISCELLANEOUS CULTURAL FEATURES

Farmstead, house  
(common in urban areas)

Church



School



Indian mound (label)



Located object (label)



Tank (label)



Wells, oil or gas



Windmill



Kitchen midden



## WATER FEATURES

## DRAINAGE

Perennial, double line



Perennial, single line



Intermittent



Drainage end



Canals or ditches



Double-line (label)



Drainage and/or irrigation



## LAKES, PONDS AND RESERVOIRS

Perennial



Intermittent



## MISCELLANEOUS WATER FEATURES

Marsh or swamp



Spring



Well, artesian



Well, irrigation



Wet spot

SPECIAL SYMBOLS FOR  
SOIL SURVEY

SOIL DEFINITIONS AND SYMBOLS

150

## ESCARPMENTS

Bedrock  
(points down slope)Other than bedrock  
(points down slope)

## SHORT STEEP SLOPE

## GULLY

## DEPRESSION OR SINK

SOIL SAMPLE  
(normally not shown)

## MISCELLANEOUS

Blowout



Clay spot



Gravelly spot



Gumbo slick or scabby spot (sodic)

Dumps and other similar  
non-soil areas

Prominent hill or peak

Rock outcrop (5 acres each  
(includes sandstone and shale)

Saline spot



Sandy spot



Severely eroded spot



Slide or slip (tips point upslope)

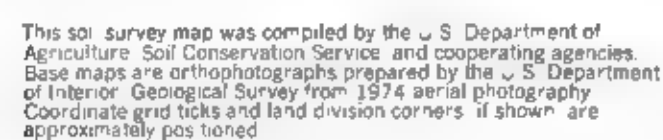


Stony spot, very stony spot

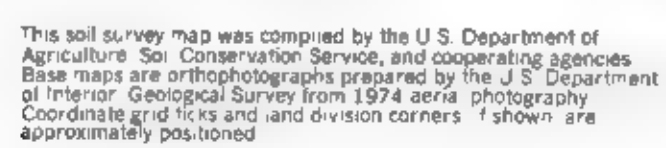


Slickens (0 acres each)











This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U. S. Department of Interior, Geological Survey from 1974 series photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 4000 3000 2000 1000 0 5000 10000 Feet  
1 2 3 Kilometers  
Scale 1:24,000

R 20 E | R 21 E (Join inset sheet 11) 38 213 19 17 50 39 3

T 19 N  
T 18 N

T 19 N  
T 18 N

Join sheet 5

T 18 N  
T 17 N

R 20 E | R 21 E

Join sheet 7

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1974 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



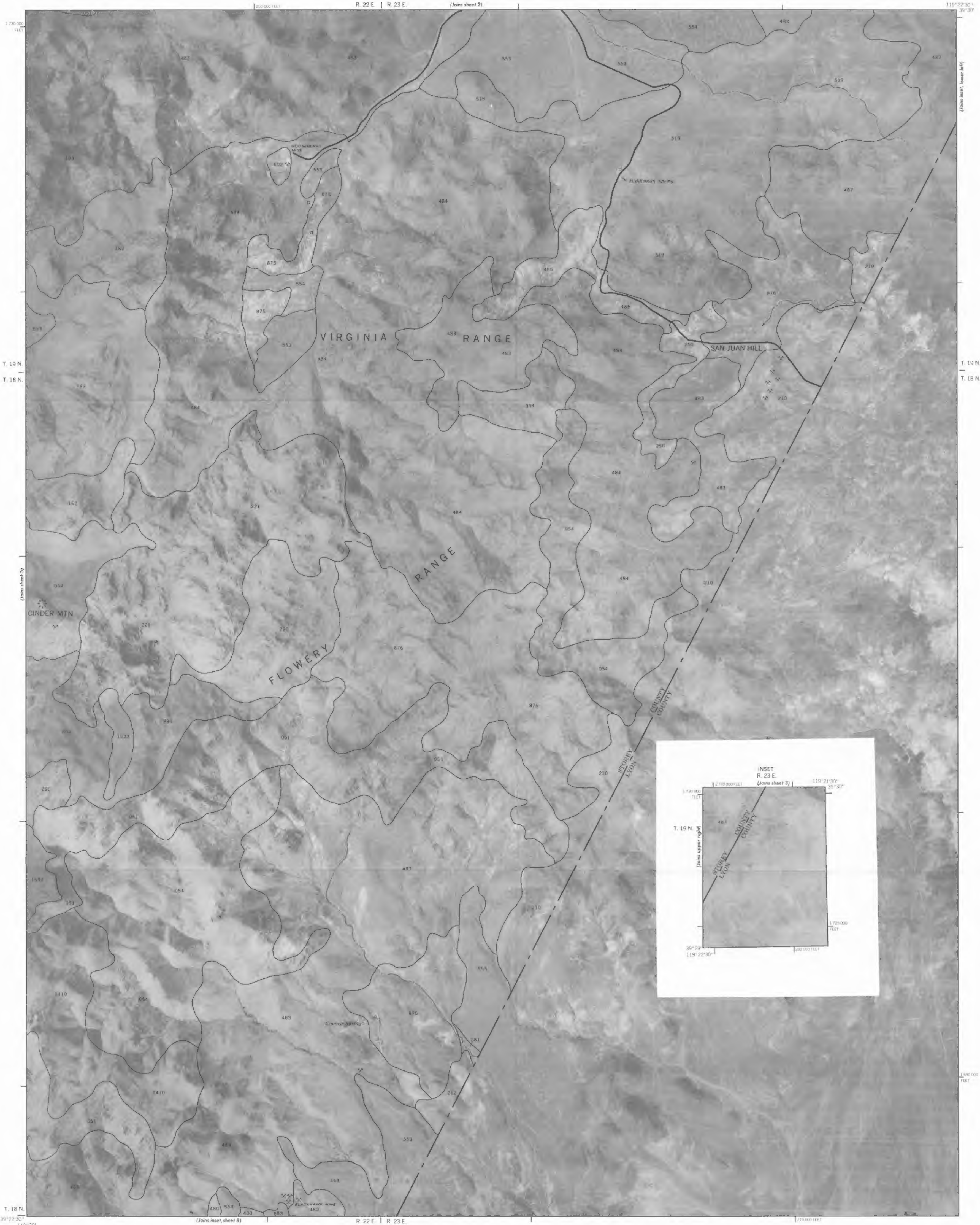
STOREY COUNTY AREA, NEVADA NO. 4



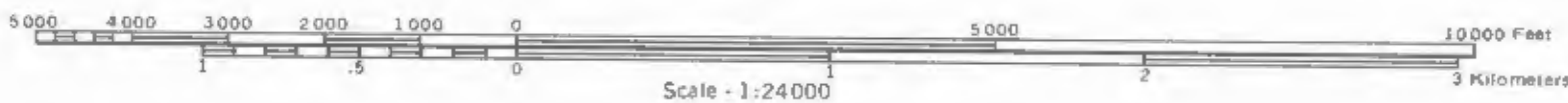


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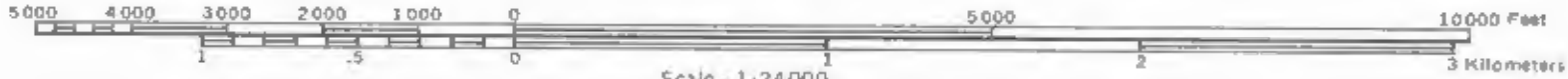


STOREY COUNTY AREA, NEVADA NO. 6

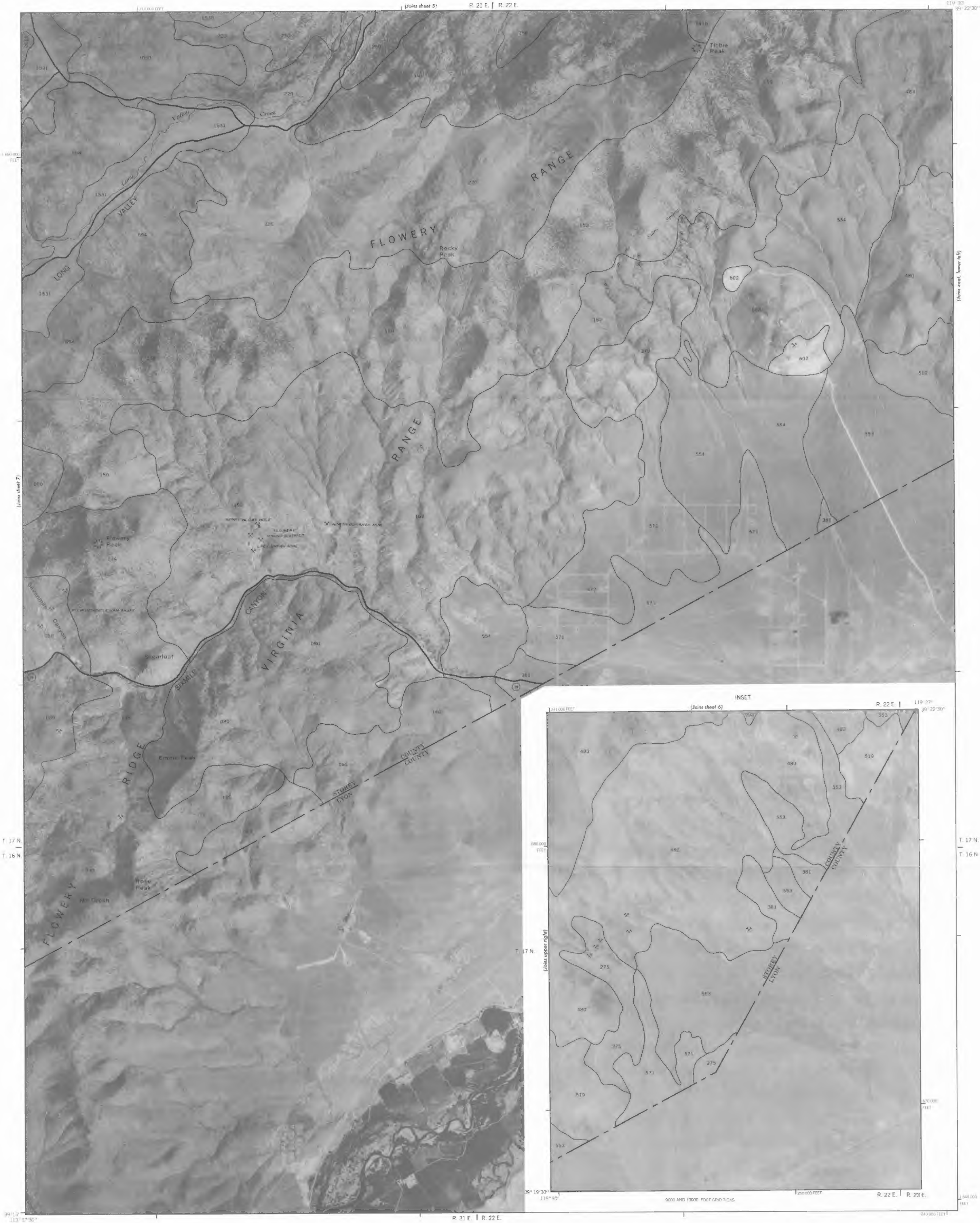




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